SEALS.

1, 2, Harp Seal (Male and Female) 3, Pennants Pied Seal. 4, Marbled Seal. 5, Common Seal of the Scotch Coasts.
6, Walrus or Sea Horse. 7, 8. Fur Seal of commerce.

BLACKIE'S

MODERN CYCLOPEDIA

OF

UNIVERSAL INFORMATION.

A HANDY BOOK OF REFERENCE ON ALL SUBJECTS AND FOR ALL READERS.

WITH NUMEROUS PICTORIAL ILLUSTRATIONS AND A SERIES OF MAPS.

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LIST OF PLATES.

	Page
ANIMALS OF THE SEAL FAMILY, - - - -	*Frontispiece.*
THE GREAT PYRAMID AND THE SPHINX, - - - - -	88
MAP OF THE RUSSIAN EMPIRE, - - - - - - - -	284
SALMON AND SALMON CULTURE, - - - - - - - -	314
MAP OF SCOTLAND, - - - - - - - - - - -	384
ENGLISH SEALS, ROYAL AND OTHER, - - - - - -	406

BESIDES

200 ILLUSTRATIONS IN THE TEXT.

KEY TO THE PRONUNCIATION.

The pronunciation of the words that form the titles of the articles is indicated in two ways: 1st, By *re-writing* the word in a different form and according to a simple system of transliteration. 2d, By marking the syllable on which the chief *accent* falls. Entries which simply have their accentuation marked are English or foreign words that present little difficulty, and in regard to which readers can hardly go far wrong. A great many of the entries, however, cannot be treated in this way, but must have their pronunciation represented by a uniform series of symbols, so that it shall be unmistakable. In doing this the same letter or combination of letters is made use of to represent the same *sound*, no matter by what letter or letters the sound may be represented in the word whose pronunciation is shown. The key to the pronunciation by this means is greatly simplified, the reader having only to remember one character for each sound. Sounds and letters, it may be remarked, are often very different things. In the English language there are over forty sounds, while in the English alphabet there are only twenty-six letters to represent them. Our alphabet is, therefore, very far from being adequate to the duties required of it, and still more inadequate to represent the various sounds of foreign languages.

The most typical *vowel* sounds (including diphthongs) are as shown in the following list, which gives also the characters that are used in the Cyclopedia to show their pronunciation, most of these being distinguished by diacritical marks.

ā, as in *fa*te, or in *ba*re.
ä, as in *a*lms, Fr. â*m*e, Ger. B*a*hn=á of Indian names.
å, the same sound short or medium, as in Fr. b*a*l, Ger. M*a*nn.
a, as in f*a*t.
a̱, as in f*a*ll.
a, obscure, as in r*u*r*a*l, similar to *u* in b*u*t, *e* in h*e*r: common in Indian names.
ē, as in m*e*=*i* in machíne.
e, as in m*e*t.
ė, as in h*e*r.
ī, as in pīne, or as *ei* in Ger. m*ei*n.
i, as in pĭn, also used for the short sound corresponding to ē, as in French and Italian words.
eu, a long sound as in Fr. j*eû*ne, =Ger. long ö, as in Söhne, Göthe (Goethe).
eu, corresponding sound short or medium, as in Fr. p*eu*=Ger. ö short.
ō, as in n*o*te, m*oa*n.
o, as in n*o*t, s*o*ft—that is, short or medium.
ŏ, as in m*o*ve, t*wo*.
ū, as in t*u*be.
u, as in t*u*b: similar to ė and also to *a*.
u̱, as in b*u*ll.
ü, as in Sc. ab*u*ne=Fr. *û* as in d*û*, Ger. *ü* long as in gr*ü*n, B*ü*hne.
u̇, the corresponding short or medium sound, as in Fr. b*u*t, Ger. M*ü*ller.
oi, as in *oi*l.
ou, as in p*ou*nd; or as *au* in Ger. H*au*s.

Of the *consonants*, b, d, f, h, j, k, l, m, n, ng, p, sh, t, v, z, always have their common English sounds, when used to transliterate foreign words. The letter c is not used by itself in re-writing for pronunciation, s or k being respectively used instead. The only consonantal symbols, therefore, that require explanation are the following:—

ch is always as in *ch*ich.
d, nearly as *th* in *th*is=Sp. *d* in Ma*d*rid, &c.
g is always hard, as in *g*o.
h represents the guttural in Scotch lo*ch*, Ger. na*ch*, also other similar gutturals.
n̨, Fr. nasal *n* as in bo*n*.
r represents both English *r*, and *r* in foreign words, which is generally much more strongly trilled.
s, always as in *s*o.
th, as *th* in *th*in.
th, as *th* in *th*is.
w always consonantal, as in *w*e.
x=ks, which are used instead.
y always consonantal, as in *y*es (Fr. *ligne* would be re-written lēny).
zh, as *s* in plea*s*ure=Fr. *j*.

Potamogeton (-mo-gē'ton), a genus of aquatic plants belonging to the natural order Naiadaceæ. It has a perfect flower, a four-pointed perianth, four sessile anthers, four ovaries, and four drupes or nuts. Several species are indigenous to Britain, where they are known by the name of *pond-weed*.

Potash, or POTASSA, an alkaline substance obtained from the ley of vegetable ashes which is mixed with quicklime and boiled down in iron pots, and the residuum ignited, the substance remaining after ignition being common potash. It derives its name from the *ashes* and the *pots* (called potash kettles) in which the lixivium is (or used to be) boiled down. An old name was *vegetable alkali*. Potash in this crude state is an impure carbonate of potassium, which when purified is known in commerce as *pearl-ash*. It is used in the making of glass and soap, and large quantities of it are now produced from certain 'potash minerals' (especially carnallite), instead of from wood ashes. What is known as *caustic potash* (hydrate of potassium, KHO) is prepared from ordinary potash. It is solid, white, and extremely caustic, *eating* into animal and vegetable tissues with great readiness. It changes the purple of violets to green, restores reddened litmus to blue and yellow turmeric to reddish-brown. It rapidly attracts humidity from the air, and becomes semi-fluid. It is fusible at a heat of 300°, and is volatilized at low ignition. It is used in surgery under the name of *lapis infernālis* or *lapis causticus* for destroying warts, fungoid growths, &c., and may be applied beneficially to the bites of dogs, venomous serpents, &c. In chemistry it is very extensively employed, both in manufactures and as an agent in analysis. It is the basis of the common soft soaps, for which purpose, however, it is not used in its pure state. See *Potassium*.

Potash Water, an aerated water produced by mixing bicarbonate of potash with carbonic acid water in the proportion of 20 grains to each bottle of the water, or about half an ounce to the gallon. Bisulphate of potash, as being cheaper than tartaric acid, is sometimes used (but should not be) with carbonate of soda to produce the common effervescing drink. A valuable medicinal water is compounded of a certain proportion of bromide of potassium. See *Aerated Waters*.

Potas'sium (a latinized term from *potash*), a name given to the metallic basis of potash, discovered by Davy in 1807, and one of the first-fruits of his electro-chemical researches; symbol, K; atomic weight, 39·1. Next to lithium it is the lightest metallic substance known, its specific gravity being 0·865 at the temperature of 60°. At ordinary temperatures it may be cut with a knife and worked with the fingers. At 32° it is hard and brittle, with a crystalline texture; at 50° it becomes malleable, and in lustre resembles polished silver; at 150° it is perfectly liquid. Potassium has a very powerful affinity for oxygen, which it takes from many other compounds. A freshly-exposed surface of potassium instantly becomes covered with a film of oxide. The metal must therefore be preserved under a liquid free from oxygen, rock-oil or naphtha being generally employed. It conducts electricity like the common metals. When thrown upon water it decomposes that liquid with evolution of hydrogen, which burns with a pale violet flame, owing to the presence in it of potash vapour. *Chloride* of potassium (K Cl) is known in commerce as 'muriate of potash,' and closely resembles common salt (chloride of sodium). It is obtained from potassic minerals, the ashes of marine plants (kelp), and from sea-water or brine springs. It enters into the manufacture of saltpetre, alum, artificial manures, &c. *Bromide* and *iodide* of potassium are useful drugs. (For

the *carbonate* of potassium see *Potash.*) *Bi-carbonate* of potassium is obtained by exposing a solution of the carbonate to the air, carbonic acid being imbibed from the atmosphere, and crystals being deposited; or it is formed more directly by passing a current of carbonic acid gas through a solution of the carbonate of such a strength that crystals form spontaneously. It is much used in medicine for making effervescing drinks. *Nitrate* of potassium is *nitre*, or *saltpetre.* (See *Nitre.*) *Sulphate* of potassium (K_2SO_4) is used medicinally as a mild laxative, in making some kinds of glass and alum, and in manures. The *bi-sulphate* ($KHSO_4$) is used as a chemical reagent, and in calico-printing and dyeing. *Chlorate* of potassium ($KClO_3$) is employed in the manufacture of lucifer matches, in certain operations in calico-printing, and for filling friction-tubes for firing cannon. It is a well-known source of oxygen. The *bi-chromate* ($K_2Cr_2O_7$) is also used in calico-printing and dyeing. *Cyanide* of potassium (KC_7) is much used in photography.

Potato (*Solānum tuberōsum*), a plant belonging to the natural order Solanaceæ, which also includes such poisonous plants as nightshade, henbane, thorn-apple, and tobacco. We owe this esculent to western South America, where it still grows wild chiefly in the region of the Andes, producing small, tasteless, watery tubers. The potato was first introduced into Europe by the Spaniards after the conquest of Peru, by whom it was spread over the Netherlands, Burgundy, and Italy before the middle of the 16th century. In Germany it is first heard of as a rarity in the time of Charles V. Sir John Hawkins, Sir Francis Drake, and Sir Walter Raleigh are all credited with the first introduction of the tuber into England (1565). Although the potato was tolerably widely distributed on the continent of Europe before its appearance in Britain it seems to have been cultivated more as a curiosity than as an article of food, and Ireland is said to have been the country in which it was first cultivated on a large scale for food. In the course of the 18th century it became a favourite article of food with the poorer classes in Germany; but in France there existed so violent a prejudice against it that it did not come into general use until towards the end of the century. The potato is a perennial plant, with angular herbaceous stems, growing to the height of 2 or 3 feet; leaves pinnate; flowers pretty large, numerous, disposed in corymbs, and coloured violet, bluish, reddish, or whitish. The fruit is globular, about the size of a gooseberry, reddish-brown or purplish when ripe, and contains numerous small seeds. The tubers, which furnish so large an amount of the food of mankind, are really underground shoots abnormally dilated, their increase in size having been greatly fostered by cultivation. Their true nature is proved by the existence of the 'eyes' upon them. These are leaf-buds, from which, if a tuber or a portion of it containing an eye is put into earth, a young plant will sprout, the starchy matter of the tuber itself supplying nutriment until it throws out roots and leaves, and so attains an independent existence. The potato succeeds best in a light sandy loam containing a certain proportion of vegetable matter. The varieties are very numerous, differing in the time of ripening, in their form, size, colour, and quality. New ones are readily procured by sowing the seeds, which will produce tubers the third year, and a full crop the fourth. But the plant is usually propagated by sowing or planting the tubers, and it is only in this way that any one variety can be kept in cultivation. Like all plants that are extensively cultivated, and under very different circumstances of soil, climate, and artificial treatment, the potato is extremely subject to disease. Among the diseases to which it is liable are the 'curl,' the 'scab,' the 'dry-rot,' and the 'wet-rot,' besides the more destructive potato disease proper. The principal feature of the curl is the curling of the shoots soon after their first appearance. After that they make little progress, and sometimes disappear altogether. The plants produce no tubers, or only a few minute ones, which are unfit for food. The scab is a disease that attacks the tubers, which become covered with brown spots on the outside, while underneath the skin is a fungus called *Tubercinia scabies.* The dry-rot is characterized by a hardening of the tissues, which are completely gorged with mycelium (the vegetative part of fungi). In the disease called wet-rot the potato is affected much in the same way as by the dry-rot; but the tubers, instead of becoming hard and dry, are soft. The fungus present in wet-rot is supposed to be the same that accompanies dry-rot. The potato disease *par excellence* was first observed in a serious form in Great Britain in the year 1845. Usually the first sign of this disease is the appearance of brown

patches upon the haulms and leaves. These spots appear about the time the plants attain their full growth, and when carefully examined are found to be surrounded by a ring of a paler colour. The whole of this outer ring is infested with a fungus called the *Botrȳtis* or *Peronospŏra infestans*, which is a constant accompaniment of the disease, if not its cause. If the weather be dry the progress of the disease is slow, but if a moist warm day supervene it will be found that the mould spreads with great rapidity, and sometimes the whole plant becomes putrid in a few days. The disease first shows itself in a tuber by appearing as a brownish spot, and the part affected may be cut out, leaving the remainder quite wholesome. None of the plans adopted for mitigating the potato disease have been very effective. The potato is also attacked by various insects, the most destructive being the Colorado beetle. The tubers consist almost entirely of starch, and being thus deficient in nitrogen, should not be too much relied on as a staple article of diet. Potatoes are extensively used as a cattle-food, and starch is also manufactured from them. A coarse spirit (Berlin spirit, British brandy) is also obtained from them by distillation, the starch being converted into sugar by means of malt or sulphuric acid, and then fermentation set up.

Potato-bug, a name given in America to many insects injurious to the potato, such as the *Colorado beetle* (which see).

Potchefstroom (pot'shef-strōm), a town in the Transvaal, South Africa, on the Mooi river, about 25 miles N. of the Vaal river. Pop. 3900.

Potemkin (pot-yom'kin), GREGORY ALEXANDROVITCH, Russian general, a favourite of the Empress Catharine II., born in 1736, died in 1791. Descended from an ancient Polish family, and early trained to the military profession, he soon after her accession attracted the attention of Catharine, who appointed him colonel and gentleman of the chamber. Soon after he gained the entire confidence of Catharine, and became her avowed favourite. From 1776 till his death, a period of more than fifteen years, he exercised a boundless sway over the destinies of the empire. In 1783 he suppressed the khanate of the Crimea, and annexed it to Russia. In 1787, being desirous of expelling the Turks from Europe, he stirred up a new war, in the course of which he took Oczakoff by storm (1788). In the following year (1789) he took Bender, but as the finances of Russia were now exhausted Catharine was desirous of peace. Potemkin, however, resolved on conquering Constantinople, resisted the proposal to treat with the enemy, and went to St. Petersburg to win over the empress to his side (March, 1791); but during his absence Catharine sent plenary powers to Prince Repnin, who signed a treaty of peace. When Potemkin learned what had been done he set out for the army, resolved to undo the work of his substitute; but he died on the way, at Nicolaieff.

Potential, a term in physics. If a body attract, according to the law of universal gravitation, a point whether external or of its own mass, the sum of the quotients of its elementary masses, each divided by its distance from the attracted point, is called the *potential*. The potential at any point near or within an electrified body is the quantity of work necessary to bring a unit of positive electricity from an infinite distance to that point, the given distribution of electricity remaining unaltered.

Potential Energy, that part of the energy of a system of bodies which is due to their relative position, and which is equal to the work which would be done by the various forces acting on the system if the bodies were to yield to them. If a stone is at a certain height above the earth's surface the potential energy of the system consisting of the earth and stone, in virtue of the force of gravity, is the work which might be done by the falling of the stone to the surface of the earth.

Potential Mood, that mood of a verb which expresses an action, event, or circumstance as merely possible, formed in English by means of the auxiliaries *may* or *can*.

Potentil'la, a genus of herbaceous perennials, nat. order Rosaceæ, found chiefly in the temperate and cold regions of the northern hemisphere, containing about 120 species. They are tall or procumbent herbs, rarely undershrubs, with digitate or unequally pinnate leaves, and for the most part yellow or white flowers. Several species are British. *P. anserīna* is also called silver-weed, goose-grass, or wild tansy, the leaves of which are greedily devoured by geese; and *P. fragariastrum*, barren strawberry. *P. reptans* is a well-known creeping plant with conspicuous yellow flowers. The roots of *P. anserina* are eaten in the Hebrides, either raw or boiled. *P. Tormentilla* is used in Lapland and the Orkney Islands

both to tan and to dye leather, and also to dye worsted yarn. It is also employed in medicine as a gargle in the case of enlarged tonsils and other diseases of the throat, and for alleviating gripes in cases of diarrhœa.

Poten'za, a town of Southern Italy and a bishop's see, capital of the province of the same name, on a hill of the Apennines near the Basento, 85 miles E.S.E. of Naples. It is walled, and is indifferently built. It suffered severely by earthquake in 1857, most of the buildings having fallen and many lives being lost. Pop. 20,353.—The province is partly bounded by the Gulf of Taranto and the Mediterranean. Its chief productions are maize, hemp, wine, silk, cotton. Area, 4122 square miles; pop. 546,662.

Pote'rium, a genus of plants, nat. order Rosaceæ and sub-order Sanguisorbeæ. *P. Sanguisorba*, or salad-burnet, which grows on dry and most frequently chalky pastures, is the only British species. It is valuable for fodder, and is used in salad. It has pinnate leaves and tall stems surmounted by dense heads of small flowers.

Poti, a Russian town in Transcaucasia, on the eastern coast of the Black Sea. It has extensive harbour works, and is connected by railway with Tiflis. Its chief export is manganese ore. Pop. 6000.

Pot Metal, an inferior kind of brass (copper, 10 parts; lead, 6 to 8), used for making various large vessels employed in the arts. Also a kind of stained glass in which the colours are incorporated with the substance by being added while the glass is in a state of fusion.

Potocki (po-tots'ki), an ancient Polish family, taking its name from the castle of Potok, and still holding possessions in Galicia and the Ukraine. Among its most distinguished members was Count Ignatius, grand marshal of Lithuania before the downfall of Poland, and a fellow-patriot of Kosciusko, born 1751. In 1791 he took refuge in Saxony, and published a political tract upon the establishment and fall of the constitution,—returning, however, to share in the last struggle for independence. He then passed some time in the prisons of St. Petersburg and Warsaw, and died at Vienna 1809.

Poto'mac, a river of the United States, which forms the boundary between Maryland and Virginia, passes Washington, and after a course of nearly 400 miles flows into Chesapeake Bay, being about 8 miles wide at its mouth. The termination of the tide-water is at Washington, about 125 miles from the sea, and the river is navigable for large ships all that distance. Above Washington are several falls which obstruct navigation.

Pot'oroo. See *Kangaroo Rat.*

Potosi (pot-o-sē'; common pronunciation, po-tō'sē), a city of Southern Bolivia, in the department of same name, on the slope of the mountain mass of Cerro de Potosi, more than 13,000 feet above the sea-level, in bare and barren surroundings. It is regularly built, and has a cathedral, a mint, &c. It has long been celebrated for its silver-mines, which were at one time exceedingly productive, and have again begun to show an improved return. The city was founded in 1547, and the population increased so rapidly that in 1611 it amounted to 150,000, but at present it is only about 12,000.—The department has an area of 54,000 sq. miles, and is celebrated for its mineral wealth, especially silver. Pop. 237,755.

Pot-pourri (pō-pō-rē; French) signifies the same as *olla podrida* (which see); also, and more generally, a musical medley, or a literary composition made up of parts put together without unity or bond of connection.

Potsdam, a town in Prussia, a bishop's see, capital of the province of Brandenburg, and the second royal residence of the kingdom, is charmingly situated in the midst of wooded hills, 17 miles south-west of Berlin, on the Havel, which here has several lakes connected with it. It is, on the whole, one of the handsomest and most regularly built towns in Germany, and with its suburbs now covers a large space. The principal edifices are the royal palace (remodelled 1750), with interesting memorials of Frederick the Great; Garrison Church, containing the tombs of William I. and Frederick the Great; the Nikolai Church, the French Protestant Church, built after the model of the Pantheon at Rome; the town-house; and the Barberini Palace, erected by Frederick the Great in imitation of that at Rome, but rebuilt in 1850–52. Immediately to the west, outside the Brandenburg Gate (resembling a Roman triumphal arch), are the palace and park of Sans Souci. The palace, a building of one story, was erected under the direction of Frederick the Great; the grounds are finely laid out, and contain various fountains, &c., and an orangery 330 yards long. In the same neighbourhood is the New Palace, a vast brick building ex-

hibiting much gaudy magnificence. A third palace in the environs of the town is called the Marble Palace. Potsdam was an unimportant place till the Great Elector selected it as a place of residence and built the royal palace in the town (1660–71). Pop. 58,452.

Potstone (*Lapis ollāris*), a species of talc containing an admixture of chlorite. Its colour is green of various shades; it is greasy and soft, but becomes hard on being exposed to the air. It derives its name from its capability of being made into vases, &c., by turning. It was obtained by the ancients from quarries in the island of Siphnos and in Upper Egypt. It is now quarried in the Valais in Switzerland, in Norway, Sweden, Greenland, and the neighbourhood of Hudson's Bay.

Pott, AUGUST FRIEDRICH, German philologist, born in 1802. He studied at Göttingen, became a teacher in the gymnasium at Celle, and subsequently privat-docent in the University of Berlin (in 1830). In 1833 he was appointed extraordinary professor of linguistic science at Halle, and ordinary professor in 1839. He died at Halle in 1887. Pott's greatest work is his Etymologische Forschungen (Etymological Researches; second and enlarged edition, 1859–76, 10 vols.); another important work was his Zigeuner in Europa und Asien (The Gypsies in Europe and Asia).

Potter, JOHN, D.D., English classical scholar and divine, primate of all England, born in 1674, was the son of a linen-draper of Wakefield. In 1706 he became chaplain to Queen Anne. In 1708 he was appointed regius professor of divinity at Oxford, in 1715 was raised to the see of Oxford, and in 1737 appointed Archbishop of Canterbury. He died in 1747. His works include Archæologia Græca, a work on Greek antiquities, A Discourse on Church Government (1707), an edition of Clemens Alexandrinus (1714), and theological works (Oxford, 1753).

Potter, PAUL, a celebrated Dutch painter of animals, born at Enkhuisen in 1625. He received his first instruction in art from his father, Pieter Potter (1587–1655), a painter of some note. He devoted himself specially to the study of animals, producing his first-signed picture, The Herdsman, in 1643. His works, specimens of which are in the more important European galleries, are highly esteemed. His colouring is brilliant, and the separate parts are delicately executed, yet without stiffness or mannerism. His pictures are generally of small size; but there is a celebrated one of large size in the museum of the Hague. It represents a man and cattle, with a bull in the foreground, and is known as Paul Potter's bull. He died at Amsterdam in 1654, at the early age of twenty-nine. His engravings are much esteemed, and his paintings command a high price.

Potteries, THE, a district of Staffordshire, head-quarters of the English earthenware and porcelain manufacture, comprising the towns of Burslem, Hanley, Stoke, Longton, Newcastle-under-Lyme, Tunstall, &c.

Potter's Clay. See *Clay*.

Pottery, the art of forming vessels or utensils of any sort in clay. This art is of high antiquity, being practised among various races in prehistoric times. We find mention of earthenware in the Mosaic writings. The Greeks had important potteries at Samos, Athens, and Corinth, and attained great perfection as regards form and ornamentation. Demaratus, a Greek, the father of Tarquinius Priscus, king of Rome, is said to have instructed the Etruscans and Romans in this art. Glazed earthenware was long supposed to be of no older date than the 9th century of our era, and to have originated with the Arabs in Spain; but the discovery of glazed ware in Egypt, of glazed bricks in the ruins of Babylon, of enamelled tiles and glazed coffins of earthenware in other ancient cities, proves that this is not the case. The Arabs, however, seem to be entitled to the credit of having introduced the manufacture of glazed ware into modern Europe. The Italians are said first to have become acquainted with this kind of ware as it was manufactured in the Island of Majorca, and hence they gave it the name of *majolica*. They set up their first manufactory at Faenza in the 15th century. In Italy the art was improved, and a new kind of glaze was invented, probably by Luca della Robbia. The French derived their first knowledge of glazed ware from the Italian manufactory at Faenza, and on that account gave it the name of *faïence*. About the middle of the 16th century the manufactory of Bernard Palissy at Saintes in France became famous on account of the beautiful glaze and rich ornaments by which its products were distinguished. A little later the Dutch began to manufacture at Delft the more solid but less beautiful ware which thence takes its

name. The principal improver of the potter's art in Britain was Josiah Wedgwood in the last century. Porcelain or chinaware first became known in Europe about the end of the 16th century through the Dutch, who brought it from the East. See *Faïence* and *Chinaware*.

Though the various kinds of pottery and porcelain differ from each other in the details of their manufacture, yet there are certain general principles and processes which are common to them all. The first operations are connected with the preparation of the potter's paste, which consists of two different ingredients, an earthy substance, which is the clay proper; and a siliceous substance, which is necessary to increase the firmness of the ware, and render it less liable to shrink and crack on exposure to heat. The clay is first finely comminuted, and reduced to the consistency of cream, when it is run off through a set of wire, gauze, or silk sieves into cisterns, where it is diluted with water to a standard density. The other ingredient of the potter's material is usually ground flints, or flint powder, as it is called. The flint nodules are reduced to powder by being heated and then thrown into water to make them brittle. They are then passed through a stamping-mill and ground to fine powder; which, treated in much the same way as the clay, is finally passed as a creamy liquor into a separate cistern. These liquors are now mixed in such measure that the dry flint-powder bears to the clay the proportion of one-sixth or one-fifth, or even more, according to the quality of the clay and the practice of the manufacturer. The mixture is then forced into presses, lined with cloth, by means of a force-pump, the cloth retaining the clay and allowing the water to escape. The clay now forms a uniform inelastic mass, which is cut into cubical lumps and transferred to a damp cellar, where it remains until a process of fermentation or disintegration renders it finer in grain and not so apt to crack in the baking. But even after this process the ingredients composing the paste are not intimately enough incorporated together nor sufficiently fine in texture until another operation has been undergone, called *slapping* or *wedging*, which consists in repeatedly breaking the lumps across and striking them together again in another direction, dashing them on a board, &c. This final process of incorporation is now most frequently performed by machinery.

Successive Stages of Earthenware Vessel on the Potter's Wheel.

In making earthenware vessels, if they are of a circular form, the first operation after the paste has been made is turning, or what is technically called *throwing* them on the wheel. This is an apparatus resembling an ordinary turning-lathe, except that the surface of the *chuck*, or support for the clay, is horizontal instead of vertical. The chuck is in fact a revolving circular table, in the centre of which a piece of clay is placed, which the potter begins to shape with his hands. The rotary motion of the table gives the clay a cylindrical form in the hands of the potter, who gradually works it up to the intended shape. It is then detached from the revolving table and dried, after which, if intended for finely-finished ware, it is taken to a lathe and polished. It is at this stage that the handles and other prominent parts are fitted on, which is done by means of a thin paste of clay called *slip*. The articles are now removed to a room in which they are dried more thoroughly at a high temperature. When they have reached what is called the *green* state they are again taken to a lathe and more truly shaped, as well as smoothed and burnished. When the articles are not of a circular form, and accordingly cannot be produced by means of the wheel, they are either pressed or cast in moulds of plaster of Paris. In the

former case the paste used is of the same consistence as that employed on the wheel; in the latter moulds of the same sort are used, but the clay mixture is poured into them in the condition of slip. By the absorption of the water in the parts next the dry mould a crust is formed of greater or less thickness, according to the time that the liquid is allowed to remain. The mŏulds are in two or more pieces, so as to be easily detached from the moulded article.

When shaped and dried the articles are ready for the kiln, in which they are exposed to a high temperature until they acquire a sufficient degree of hardness for use. The paste of which the earthenware is composed is thus converted into what is called *bisque* or *biscuit*. While undergoing this process of baking the articles are inclosed in larger vessels of baked fire-clay, called *saggers*, to protect them from the fire and smoke, and to distribute the heat more uniformly. The whole firing lasts from forty to forty-two hours. After the kilns have been allowed to cool very slowly, the articles are taken out, and if they are not to be decorated in colour, and sometimes also when they are to be so decorated, they are immersed in a vitrifiable composition called *glaze*, which, after the vessels have been a second time subjected to heat in glazed saggers, is converted into a coating of glass, rendering the vessels impermeable to water.

These processes are all that are necessary to complete a plain earthenware vessel, but very frequently the vessels are adorned with printed or painted decorations executed in colours, such as may be burned into the substance of the article. There are two methods of printing on earthenware: press-printing, which is done on the bisque, and bat-printing, done on the glaze. In both cases an engraving is first executed in copper, and thence transferred, by means of a sheet of paper containing an impression, to the article requiring to be printed; but the processes are slightly different in detail. When the vessel has received its impression it is ready to be fired in the enamel kiln. Painting on earthenware is effected with a brush over the glaze.

All the numerous varieties of earthenware are made in the manner just described, with only slight modifications in the nature of the ingredients of their composition or the processes of manufacture. Stoneware may be formed of the clays which are used for other vessels, with the addition of different sorts of sand, and sometimes of cement. A greater degree of heat is applied than in the case of ordinary earthenware, and when some fluxing substance is added it has the effect of producing that state of semi-fusion which is the distinguishing quality of stoneware. A kind of semi-vitrified ware, first made by Wedgwood, takes its name from him. It is made of two different kinds of pastes, both very plastic. This ware is incapable of taking on a superficial glaze; but by a process called *smearing*, which is simply baking at a high heat in saggers coated internally with a glaze, acquires a remarkable lustre.

Porcelain or chinaware is formed only from argillaceous minerals of extreme delicacy, united with siliceous earths capable of communicating to them a certain degree of translucency by means of their vitrification. Porcelain is of two kinds, hard and tender. Both consist, like other earthenwares, of two parts—a paste which forms the biscuit, and a glaze. The biscuit of hard porcelain is composed of kaolin or china clay, and of decomposed felspar. The glaze consists of a felspar rock reduced to a fine powder, and mixed with water, so as to form a milky liquid into which the articles are dipped after a preliminary baking. Tender porcelain biscuit is made of a vitreous frit, composed of siliceous sand or ground flints, with other ingredients added, all baked together in a furnace till half-fused, and then reduced to a condition of powder. The glaze of tender porcelain is a specially prepared glass ground fine, and made into a liquid by mixing with water. The processes employed in manufacturing porcelain wares are very much the same as those used for other kinds of earthenware, but requiring more delicacy and care. The biscuit paste even of hard porcelain has so little tenacity compared with that of earthenware that it cannot easily be shaped on the wheel, and is consequently more frequently moulded. The paste of tender porcelain is still less tenacious, so that the wheel cannot be used for it at all, and a little mucilage of gum or black soap must be added before it can be worked even in moulds. During the baking, too, it becomes so soft that every part of an article must be supported. Tender porcelain receives two coats of glaze.

Metallic oxides incorporated with some fusible flux, such as borax, flint, &c., are used for painting on porcelain. The colours are mixed with essential oils and turpen-

tine, and applied by means of a camel's-hair brush. When the painting is finished the vessels are baked in a peculiar kind of ovens called *muffles*, which are also used for fixing the printed figures on the glaze of stoneware. By the operation of the furnace most of the colours employed in painting porcelain become quite different, and the change which takes place in them is usually through a series of tints, so that the proper tint will not be obtained unless the baking is stopped precisely at the proper time. Sometimes porcelain has designs etched on it by means of fluoric acid. Sculptures also are executed by casting in moulds in various kinds of porcelain, called statuary porcelain, Parian, Carrara, &c. The chief seat of the manufacture of all kinds of earthenware in Great Britain is the district of Staffordshire known as 'The Potteries.'

Pottinger (pot'in-jėr), Eldred, British officer, famed for his defence of Herat in 1838, was born in Ireland in 1811, and went to Bombay at the age of 17 as artillery cadet. In 1837 he traversed Afghanistan in disguise, and reached Herat after many risks. The city was then held by an Afghan prince, and was besieged by the Persians for nearly a year, when it was relieved by a British diversion in the Persian Gulf. The credit of the defence was given to Pottinger. Major Pottinger took a leading part in the disastrous Afghan war of 1841–42, and as political agent had to sign terms with the rebels, which were afterwards repudiated by Lord Ellenborough. A trial by court-martial only served to show his conduct in brighter colours. He died, 1843, at Hong-Kong.

Pottinger, Sir Henry, Bart., G.C.B., a distinguished soldier and diplomatist, uncle of the above, born in 1789. He went to India as a cadet in 1804, and soon became known for his energy and administrative ability. Rising gradually to the rank of major-general, he was, after the Afghan campaign in 1839, raised to the baronetage as a reward for his services. In 1841 he went as minister-plenipotentiary to China, and contributed much to bring hostilities to a conclusion. He was successively governor and commander-in-chief of Hong-Kong (1843), governor of the Cape of Good Hope (1846), governor and commander-in-chief of Madras (1850–54). He died in 1856.

Potto, an animal of the lemur family inhabiting Sierra Leone, and averaging about 8 inches in length. The name is also given to the *Kinkajou* (which see).

Pottstown, a town of the U. States, Pennsylvania, on the Schuylkill, between Philadelphia and Reading. Pop. 13,285.

Pottsville, a town of the U. States, Pennsylvania, in the centre of the great anthracite coal-fields, with blast-furnaces, forges, foundries, rolling-mills, machine factories, &c. Pop. 14,117.

Potwallers, or Potwallopers (pot-boilers), a name given to a parliamentary voter in some English boroughs before the passing of the reform bill of 1832. It included, theoretically, all inhabitants procuring their own diet. In practice, every male inhabitant, whether housekeeper or lodger, who had resided six months in the borough, and had not been chargeable to any township as a pauper for twelvemonths, was entitled to vote.

Pouched Rat. See *Gopher*.

Poudrette (pö-dret'), the name given to a powdery manure obtained from ordure. It takes a long time to prepare, is pulverulent, of a brown colour, and almost inodorous. It contains on an average about 25 per cent of water, and 25 per cent of fixed salts. Largely made in France, it is in demand in all quarters, being found particularly useful for gardens. Its efficacy, weight for weight, is five times that of cow dung.

Poughkeepsie (po-kēp'si), a city in the state of New York, United States, the capital of Dutchess county, situated on the east bank of the Hudson River, 74 miles north of New York city and 70 miles south of Albany. It is built partly on a slope, partly on a plateau, about 200 feet above the river, and is prettily situated. It is distinguished for its educational institutions, and is known as the 'City of Schools.' These include Vassar College for women, one of the chief institutions of the kind in America. Poughkeepsie was the seat of the Convention of 1788, at which the federal constitution was adopted. Pop. 22,206.

Poulpe. See *Octopus*.

Poultice, in medicine, a soft moist application applied externally to some part of the body either hot or cold, but generally the former. The simple poultice is made with linseed meal and boiling water, spread out with uniform thickness on a cloth or rag, and is used where it is desired to hasten the progress of inflammation. Its moisture causes relaxation of the skin, and thereby lessens the discomfort or pain. It acts also as a counter-irritant, producing a redness and congestion of the skin. *Disinfecting*

poultices are made with charcoal, mixed with linseed-meal and bread. The *sedative poultice*, made with beer, yeast, flour, and hot water, is generally used to relieve pain in cases of cancer. The best-known poultice, however, is the *counter-irritant*, commonly called a mustard plaster. This may be made by mixing linseed-meal with water, and adding mustard. It produces a rapid but mild counter-irritation, indicated by a redness of the skin, and is very useful in cases of bronchitis, lumbago, and similar affections.

Poultry, a general name for all birds bred for the table, or kept for their eggs. The birds most commonly included under this designation are the common fowl, the pea-fowl, the guinea-fowl, the turkey, goose, and duck. There is this great difference between the varieties of the domestic fowl, that some are disposed by constitution to continue laying throughout the whole season without sitting; while others after having laid from twelve to fifteen eggs sit obstinately, and cease to lay. Among the breeds most in favour in Britain are those known as Dorking, Game, Hamburg, Cochin, Brahma, Scots Gray, Polish, Spanish, &c. Poultry, if they are to be kept for profit, should have a spacious house, with a yard and shed attached. The house should be moderately warm, well lighted, and perfectly dry. Either boxes must be formed along the walls to serve as nests for the fowls, or shelves on which baskets for the nests may be put. These boxes and shelves may be formed of wood; but they are better when constructed of smoothly polished flagstones or slates. Turkeys and geese had better not occupy at night the same house with hens and ducks, as they are apt to be mischievous, especially to sitting birds. A small pond is sufficient for the thrifty rearing of both geese and ducks.

The total stock of poultry in the British islands was recently estimated at 31,000,000, of which 20,000,000 were common fowls. Of the total stock England and Ireland had about 13,000,000 each, so that the latter country is relatively much before England in poultry-rearing, and supplies both it and Scotland with great numbers both of fowls and eggs. Poultry-rearing, indeed, as a source of profit has, it is considered, been far too much neglected by the English farmer, though recently a change for the better has been taking place. Much more attention is paid to their poultry by the French farmers, and hence the enormous quantities of eggs imported from France into England, as also from Belgium, Germany, and Denmark. The average stock kept on an English farm is said to be sixty; very large numbers are said not usually to be kept with corresponding profit. In many cases fowls are bred for exhibition and to take prizes, this and the consequent value of the eggs being often a considerable source of profit. Hatching by artificial means has long been practised in Egypt, and artificial incubators are now well known in other countries.

Pounce (a corruption of *pumice*), a fine powder formerly used to prevent ink from spreading on paper, now superseded by blotting-paper. The term is also applied to charcoal dust or some other powder used in embroidery or engraving, to trace a design or pattern by being sifted through pin-holes in the paper.

Pound, in English law, an inclosed place for keeping cattle which have strayed on another man's ground, until they are redeemed. A pound may belong to a parish or village or to a manor.

Pound, an English weight of two different denominations, *avoirdupois* and *troy*. The pound *troy* contains 5760 grains, and is divided into 12 ounces; the pound *avoirdupois*, contains 7000 grains, and is divided into 16 ounces. The *pound*, or *pound sterling*, the highest monetary denomination used in British money accounts, and equal to 20 shillings, was so called from originally being equal to a quantity of silver weighing one pound. The pound is strictly a money of account, the coin representing it being the sovereign. See *Money*.

Poundage, a rate of so much per *pound*, sometimes a percentage deducted from wages paid in advance. Also, a tax formerly levied on merchandise by weight.

Poushkin. See *Pushkin*.

Poussin (pö-saṅ), Gaspar, a French landscape-painter, born in Rome in 1613. His real name was Dughet; but having been placed under the instructions of the celebrated Nicolas Poussin, who had married his sister, he assumed the surname of his master. He lived mostly in Rome or its neighbourhood, and had extraordinary facility of execution, so that his works are very numerous, specimens being found in all the chief collections in Europe. His paintings are distinguished by grandeur and rather sombre characteristics, and storms or high winds were subjects in which he

excelled, though he was also highly successful with morning and evening effects. The pictures of his maturer period owe much to the influence of Claude. Many of his figures are said to have been supplied by Nicolas Poussin. He died about 1675.

Poussin, Nicolas, a distinguished French historical and landscape painter, born at Andelys in Normandy in 1594. He first studied in his native place, and then at Paris, under masters of little merit; but he made astonishing progress. He had already acquired considerable reputation when, in 1624, he went to Italy for the purpose of improving himself in his art; there he lodged with Du Quesnoy, the sculptor, and attended the school of Domenichino. At Rome he fell into great want, but was assisted by a Frenchman, Jacques Dughet, and by him tended through an illness brought on by over-work. In 1630 Poussin married the daughter of his benefactor. About this time his affairs began to improve. He found liberal patrons in Cardinal Barberini and in the Cavaliere Cassiano del Pozzo, for whom he painted the celebrated Seven Sacraments, now at Belvoir Castle. He was also invited to paint the great gallery of the Louvre; and his successes gained him the position of first painter to Louis XIII., with a pension of 3000 livres. From 1640 to 1642 he resided in Paris; but the rivalry of French painters and the want of appreciation of his works evinced by the Parisians induced him to return to Rome, where he lived until his death in 1665. He modelled statues and reliefs with great skill, and might have become an eminent sculptor. Historical and landscape painting, however, were the chief subjects of his genius; in these his style is grand and heroic, and his invention fertile. He has been called the Raphael of France. Among his more celebrated works are the Seven Sacraments, the Death of Germanicus, the Capture of Jerusalem, the Plague of the Philistines, Abraham's Servant and Rebecca, the Adulteress, the Infant Moses, Moses and the Daughters of Jethro at the Well, Moses bringing Water from the Rock, the Worship of the Golden Calf, John Baptizing in the Wilderness, &c., and many fine landscapes.

Pout. See *Bib.*

Pouter, a variety of fancy pigeon, the chief character of which is its very projecting breast.

Povo'a de Varzim, a seaport and bathing-place of Portugal, about 16 miles north-west of Oporto. Pop. 11,000.

Powan (*Coregŏnus clupeoides*), a fish inhabiting Loch Lomond, in Scotland, and also known as the fresh-water herring. It is of the same genus as the pollan and vendace (which see), and is represented by several species in the N. American lakes.

Powell, Baden, an English theologian and man of science, born in 1796. He took orders in the Church of England in 1820, and in 1821 was appointed to a vicarage in Kent. In 1827 he became Savilian professor of geometry at Oxford. He was the author of many works on theology, mathematics, and physical sciences; and contributed to the well-known Essays and Reviews an article on the Study of the Evidences of Christianity. He died in 1860.

Power-looms, as opposed to hand-looms, are looms driven by water or steam, and are now universally introduced into cotton and woollen manufactures. See *Weaving.*

Power of Attorney, in law, is a deed or written instrument whereby one person is authorized to act for another as his agent or attorney, either generally or in a special transaction.

Powers, Hiram, an American sculptor, the son of a farmer, born at Woodstock, Vermont, in 1805. He early displayed great ingenuity in mechanical matters, and became somewhat noteworthy on this account while acting as a shopman and assistant to a clockmaker of Cincinnati. He next obtained employment in a museum in that city. At this period he formed the acquaintance of a German sculptor, and having been taught modelling by him, determined to become himself a sculptor. In 1835 he went to Washington, and had sufficient success there to enable him to proceed to Italy. He now settled in Florence, where he resided until his death in June 1873. He is distinguished in portraiture, and produced busts of many of the most noted American statesmen. His most famous ideal works are the statue of Eve, the Greek Slave, and the Fisher Boy.

Powers, The Great, a term of modern diplomacy, by which are now meant Britain, France, Austria, Germany, Italy, and Russia.

Poynings' Law, or the statute of Drogheda, an act of the Irish parliament, passed in 1495, whereby all general statutes before that time made in England were declared of force in Ireland. It was so named from Sir Edward Poynings, deputy of Ireland

under Henry VII. in 1494, when he suppressed the revolt of Perkin Warbeck. See *Ireland* (*History*).

Poynter, Sir Edward John, R.A., son of Mr. Ambrose Poynter, an architect, was born in Paris in 1836; educated at Westminster School and Ipswich Grammar School; received his art training at the schools of the Royal Academy and under Gleyre in Paris; gained a reputation by his Israel in Egypt, exhibited in 1867, and The Catapult (1868); painted the cartoons for the mosaic of St. George in the Westminster Palace (1869). Among his chief pictures are Perseus and Andromeda (1872), More of More Hall and the Dragon (1873), The Golden Age (1875), Atalanta's Race (1876), Zenobia Captive (1878), Diadumene (1885), Under the Sea Wall (1888), and A Roman Boat-race (1889). He was elected an Associate in 1869 and a Royal Academician in 1876, became President and was knighted in 1896. He was the first Slade professor of art at University College, London. He is the author of Ten Lectures on Art (1879).

Pozoblanco (pō-thō-blán'kō), a town in Spain, in the prov. of and 36 miles north of the city of Cordova. Its inhabitants are chiefly employed in agriculture and as muleteers. Pop. 10,552.

Pozzola'na, or Pozzuolana, a sort of mortar produced in Italy and formed of volcanic ashes. When mixed with a small portion of lime it quickly hardens even under water. This singular property renders it very useful as a cement in the erection of moles and other buildings in maritime situations. It is much used in Italy as a substitute for mortar, and has received its name from Pozzuoli, the port from which it is shipped.

Pozzuo'li, the ancient *Puteoli*, a city and seaport of Southern Italy, 6 miles W.S.W. of Naples, on the shore of the Bay of Baiæ (Golfo di Pozzuoli), the north-western portion of the Bay of Naples. (See *Naples*.) The coast forms a natural harbour, which is well sheltered; and a considerable trade and an active fishing is carried on. Pozzuoli is a city of great historic interest. It was founded by the Greeks about 520 B.C., and became under Rome a great centre of commerce. St. Paul landed here in the course of his journey to Rome. Pozzuoli was destroyed by the Goths more than once, rebuilt by the Byzantine Greeks, and finally devastated by earthquakes and volcanic eruptions. It abounds in ancient ruins. The cathedral stands on the site of a temple of Augustus, and in one of the lateral walls six Corinthian columns of the old temple are preserved. A ruined temple of Serapis also remains, inclosed by forty-eight marble and granite columns. On an eminence behind the town stands the ruined amphitheatre, resting on three series of arches. In the neighbourhood are Lake Avernus, the Grotto of the Sibyl, the baths of Nero, the ruins of Baiæ and Cumæ, &c. Recently Pozzuoli has been considerably altered by the establishment of Armstrong, Mitchell, & Co.'s works for supplying guns, armour-plates, and machinery to the Italian government. Pop. 16,639.

Practice, in arithmetic, a rule for expeditiously solving questions in proportion, or rather, for abridging the operation of multiplying quantities expressed in different denominations, as when it is required to find the value of a number of articles at so many pounds, shillings, and pence each.

Pradier (prà-di-ā), Jacques, an eminent sculptor, born at Geneva in 1792. Having gone to Paris in 1809, and studied art in 1813, he gained the prize of the Academy for a bas-relief of Philoctetes and Ulysses. This work procured him admission into the French Academy at Rome. From 1823 he worked constantly at Paris, where his popularity was very great and where he was admitted to the institute in 1827. His works are of various kinds: religious, monumental, but mainly classical. In execution he ranks as a sculptor of the first class, but his invention and conception are defective, and there is, according to some critics, a decided meretriciousness in his style. He died in 1844. His works comprise: a Centaur and Bacchante, a Psyche, a Venus, a Phryne, the Three Graces, twelve colossal Victories on the monument of Napoleon I. in the Hôtel des Invalides, Statue of Rousseau at Geneva, &c.

Praed (prād), Winthrop Mackworth, an English poet, born in 1802. He was educated at Eton, where in 1820 he became one of the principal contributors to a magazine published there called The Etonian. From Eton he went to Trinity College, Cambridge, where he obtained for two years in succession the chancellor's prize for an English poem. At this time, like Macaulay, he contributed both in prose and verse to Knight's Quarterly Magazine. In 1829 he was called to the bar, and in 1830 and 1831 was returned for St. Germans to parliament, where he took a prominent part in opposing

the passing of the reform bill. He sat subsequently as member for Yarmouth, and afterwards for Aylesbury. He acted also for a short time as secretary to the board of control, and became ultimately recorder of Barnstaple and deputy high-steward for the University of Cambridge. He died in July, 1839. His poems are mostly of a light and elegant character, belonging to the class known as *vers de société*, but they also comprise others in a more serious vein.

Præfect (*præfectus*), the title of various functionaries of ancient Rome. Of these the most important was the *præfectus urbi* or *urbis* (præfect of the city). During the kingly period and the early republic the *præfectus urbis* had the right to exercise all the powers of the king or consuls in their absence. After the foundation of the prætorship (see *Prætor*) this office lost its dignity and privileges; but under the empire it was revived as that of chief permanent magistrate of the city, with important military functions. The *præfectus prætorio*, an officer under the empire, was general of the imperial life-guards. His position was one of great power, for the troops under his command frequently decided the succession to the imperial throne. (See *Prætorians.*) Many other Roman functionaries bore the title of præfect, such as the *præfectus aquarum*, who had charge of the water supply of the city; the *præfectus ærarii*, who managed the public treasury, &c.

Præmuni're, in English law, a name given to a kind of offence of the nature of a contempt against the king (or queen) and the government. The term is derived from the opening words of the writ preparatory to the prosecution of the offence—*præmonere* or *præmunire facias A. B.* (Cause A. B. to be forewarned that he appear before us, &c.). The punishment is forfeiture and imprisonment during the sovereign's pleasure. Many of the statutes are now repealed, and prosecutions upon præmunire are unheard of in our times; the last took place during the reign of Charles II.

Prænes'te, the ancient name of Palestrina (which see).

Prætor, an important official in the ancient Roman state. Up to 367 B.C. the title was merely an adjunct to that of consul; but when at that date the consulship was thrown open to the plebeians, the judicial functions of the consul were separated from his other duties and given to a new patrician magistrate, who was entitled the prætor. In 337, after a struggle, the plebeians were also admitted to this office. In 246 B.C. another magistracy, that of *prætor peregrīnus*, was instituted for the purpose of settling disputes between foreigners and between foreigners and citizens; and in distinction from him who filled this office the other functionary was termed *prætor urbānus*. After election the two prætors determined their offices by lot. The *prætor urbānus* was the first in position, and was the chief magistrate for the administration of justice. To the edicts of the successive prætors the Roman law is said to owe in a great measure its development and improvement. About B.C. 227 the number of prætors was increased to four; afterwards to six and eight; and under the empire the number varied from twelve to eighteen. After completing his year of office the prætor was often sent as *proprætor* to govern a province. See *Proconsul.*

Prætorians, the body-guard of the Roman emperors, first established as a standing body by Augustus. Under him only a small number of them were stationed in Rome, the rest being in the adjacent towns. Tiberius assembled the whole at Rome, and placed them in a prominent fortified camp, where they were used to quell any sudden popular disturbance. The number of cohorts was raised by Vitellius from nine to sixteen, and they received double pay; under the later emperors they became powerful enough to decide the succession to the throne, which they once even put up to auction. They were reorganized and their powers curtailed by Septimius Severus and by Diocletian, and were finally disbanded by Constantine the Great in 312 A.D.

Pragmatic Sanction, a public and solemn decree pronounced by the head of a legislature. In European history several important treaties are called pragmatic sanctions, but the one best known by this name is the instrument by which the German emperor Charles VI., being without male issue, endeavoured to secure the succession to his female descendants. It was in accordance with this instrument that he settled his dominions on his daughter Maria Theresa.

Prague (prāg; Bohemian, *Praha*, German, *Prag*), the capital of Bohemia, a prosperous and well-built city near the centre of the kingdom, on both sides of the Moldau, here crossed by seven bridges; 153 miles north-west of Vienna and 75 miles south-east of Dresden, with both of which it is

connected by railway. Its site is a regular basin, cut in two by the river, from the banks of which the houses rise on both sides till they are terminated and inclosed by hills of considerable height. When viewed from the Karlsbrücke, or old bridge, the city presents a most imposing appearance. It was formerly inclosed by a wall and fosse, but these defences have been now demolished. Among the public buildings of Prague are the old castle, or palace of the Bohemian kings; the R. Catholic cathedral, a Gothic structure (founded 1344) somewhat shapeless from having been only built in part, though an effort is now being made to complete it; the great pile called the Collegium Clementinum, consisting of churches and other buildings, and containing university lecture-rooms, library, &c.; the Carolinum, for students of law and medicine; the town-hall; the Teynkirche or old church of the Hussites, interesting as containing statues and other works of art and the burial-place of the astronomer Tycho Brahe; the palace of Wallenstein, originally a magnificent structure, but now much dilapidated, &c. The manufactures of Prague are of great variety, including gold and silver embroidery, silk, woollen, cotton, and linen goods, porcelain, and jewelry. The large modern suburbs of Karolinenthal, Smichow, Königliche Weinberge, &c., are busy industrial centres. From its position on the river Moldau, Prague has free communication with the Elbe, which gives it great facilities for transport in addition to its railway connections. Prague is one of the oldest towns in the kingdom, dating from the 8th century. Its university was founded in 1348, and had at one time about 10,000 students. Recently it was divided into two universities, a German and a Czech or Bohemian, having together more than 3500 students. The city was long greatly disturbed by the struggles between the R. Catholics and the Hussites. It suffered severely also in the Thirty Years' war. In 1631 the city was captured by the Saxons, who were driven out a few months later by Wallenstein. Since that date it has passed through many vicissitudes. In 1742 it was taken by the French and Bavarians, and two years later capitulated to Frederick the Great. After the Seven Years' war the city made rapid strides. During the Austro-Prussian war in 1866 Prague was occupied by the Prussians, and here the treaty of peace was signed on the 23d August. Pop. 182,530, or with suburbs 310,483, of whom about six-sevenths are Bohemians.

View in Prague.

Prahran, a town in Victoria, Australia, about 3½ miles south-east of Melbourne. Pop. 36,871. See *Melbourne*.

Prairial. See *Calendar*.

Prairie (French, 'meadow'), the name given in North America to the vast natural meadows or plains of the Mississippi valley, especially lying between it and the Rocky Mountains, and extending northwards into Central Canada. Throughout this immense territory the differences of level are sufficient

to produce a steady flow of the rivers, but not so great as to obstruct their navigation, thus securing a unique system of easy intercommunication between all sections of the country. There is a great sameness in the features of the topography, the vegetable productions, the soil, and geological features. Some of the prairies that have a peculiarly undulating surface are known as *rolling prairies*. Vast herds of buffaloes used to roam over the prairies, but these have now disappeared. Immense tracts are now cultivated, and produce large crops of wheat and maize with little outlay of labour on the part of the farmer.

Prairie-dog, or PRAIRIE MARMOT, a small rodent animal, the wistonwish (*Cynomys ludovicianus*), allied to the marmot as well as to the squirrel, and found on the North American prairies west of the Mississippi and east of the Rocky Mountains. These animals live gregariously in burrows, and are characterized by a sharp bark, like that of a small dog, whence their popular name. They are about 1 foot in length exclusive of the tail, which is rather short. Their burrows are quite close together, and have a mound of excavated earth near the entrance, on which the little animals are wont to sit and look around them. These communities are termed 'villages.' A second species, *C. columbiānus*, inhabits the region west of the Rockies. The prairie-dog is not to be confounded with the prairie-squirrel, to which it is allied.

Prairie-hen, the popular name of the pinnated grouse of the United States (*Tetrao cupīdo*). The neck of the male is furnished with neck-tufts of eighteen feathers, and is remarkable also for two loose, pendulous, wrinkled skins, which somewhat resemble an orange on inflation. The prairie-hen is much prized for the table.

Prairie-squirrel, or GOPHER, a name for several animals of North America, of the genus *Spermophilus*, found in the prairies in great numbers. They live in burrows, and not on trees, and much resemble the prairie-dog or marmot. They have cheek-pouches, in which their food is carried. This consists of prairie plants with their roots and seeds.

Prairie-wolf, or COYOTE (*Canis latrans*), the small wolf which is found on the prairies in North America, believed by many to be a mere variety of the European wolf. It is a cowardly animal, and only dangerous to man when in packs and pressed by hunger.

Prâkrit, the name of certain Hindu dialects, which acquired greater prominence as the older Sanskrit passed gradually out of use. The modern tongues of India have sprung from the Prâkrit just as the Romance languages have sprung from the old Italian dialects, and not from the literary Latin.

Prase, a dark leek-green variety of quartz, the colour of which is due to an admixture of hornblende.

Pratique (pra-tēk'), a term used to signify a kind of limited quarantine, which the captain of a vessel is held to have performed when he has convinced the authorities of the port that his ship is free from infectious diseases; more generally, the license to trade after having performed quarantine.

Prato, a town of Italy, in Tuscany, 11 miles north-west of Florence, in a fertile plain, on the right bank of the Bisenzio. It dates from the 12th century, is surrounded by ancient walls, and is a well-built, cheerful-looking place. The cathedral is very beautiful; it was begun by Nicolo Pisano, and completed after his designs in 1450 with a façade furnishing a beautiful specimen of Italian Gothic. Prato has manufactures of woollen, cotton, silk, &c. Pop. 13,410.

Prawn (*Palæmon*), a genus of crustaceans, order Decapoda, section Macrura ('long-tailed'). The common prawn (*Palæmon serratus*) is the most familiar species, and resembles the shrimp. It attains an average length of from 3 to 5 inches. The tail is broad and flat, and its terminal plates are fringed with long hairs. The colour is light-gray spotted with purple. The Isle of Wight and Hampshire coasts form the chief sources of prawn supply to the London market.

Praxit'eles (-lēz), one of the greatest sculptors of ancient Greece, a citizen, if not a native, of Athens, flourished about 364 B.C. He and his contemporary Scopas stand at the head of the later Attic school, so called in contradistinction to the earlier Attic school of Phidias. Without attempting to rival Phidias in grandeur, Praxiteles chose subjects which demanded a display of the human form, especially in the female figure. The finest is said to have been the Cnidian Aphroditē (Venus), whom he was the first to represent naked. The group of Niobe and her children, now in existence at Florence, is by some attributed to Praxiteles, and by others to Scopas. His two statues of Eros (Cupid) were also celebrated;

one of them, placed in the temple of Eros at Thespia, and the statue of a satyr were considered by Praxiteles, according to Pausanias, as his finest works. An excellent copy of the latter still exists. Among his works were also statues of Apollo, Dionysos, Demeter, &c., in marble and in bronze, which served as models to succeeding artists. Quite recently, a marble statue of Hermēs by Praxiteles has been discovered at Olympia.

Prayer, a petition offered to a divinity. The Scriptures tacitly assume that prayer was offered to God from the beginning of the world; and although we read that 'men began to call upon the name of the Lord' after Seth was born, we are forbidden by all commentators to connect this statement with the origin of prayer. It is not, however, until the time of Abraham that prayer comes first distinctly into notice. As the altar appears to have been the special place for prayer in the patriarchal age, so was the tabernacle under the Mosaic covenant until the temple, 'the house of prayer,' was built. From the time of the dedication of Solomon's temple the Jews appear to have gone there to pray, and to have turned their faces towards it if they were prevented from going there; and this custom prevails among the Jews at the present time, as does the similar custom among the Mohammedans, who turn their faces towards the sacred Kaaba at Mecca. When we come to New Testament times we meet with synagogues established as places for the public worship of God, and for reading his word. Christ taught that prayer should be offered to God in his name in order to ensure an answer. Henceforward Christ became to the Christian what the temple was to the Jew. The posture of the body in prayer is left undecided in Scripture, and although Christ gave his disciples a form of prayer of the most universal application, it does not follow that men may not pray according as each experiences special wants.

Prayer for the dead is a practice rejected by Protestants as having no scriptural warrant, but which prevails in the Roman Catholic, Greek, and other eastern churches. The custom seems to have existed in most ancient religions. The doctrine and practice came to the Christian Church through the Jews (2 Maccabees xii. 43, 45). The first of the Christian fathers who mentions prayer for the dead is Tertullian; but he speaks of the usage as long-established in the church; such prayers are frequently alluded to by St. John Chrysostom, Cyril of Jerusalem, and St. Augustine. In the burial service of the first Book of Common Prayer of the English Church some prayers for the dead appeared, but they were deleted from the second book, and are not found in the subsequent revisions.

Pre-Adamites, those supposed inhabitants of the earth prior to the creation of Adam. Ancient legends or traditions of the East speak of nations and empires existing before Adam's creation, and of a line of kings who ruled over them. In modern times the subject was taken up by Isaac de la Peyrère, who, in a work published in 1655, maintained that the Jews were the descendants of Adam, and the Gentiles those of a long anterior creation, founding his opinions on Romans v. 12–14.

Pre'bend, a yearly stipend paid from the funds of an ecclesiastical establishment, as of a cathedral or collegiate church. *Prebendary* is the person who has a prebend. A *simple* prebend is restricted to revenue only; a *dignitary* prebend is one which has a jurisdiction annexed.

Prece'dence, the order in which men and women follow each other according to rank or dignity in a state procession or on other public occasions. In England the order of precedence depends partly on statutes, and partly on ancient usage and established custom. Questions arising on matters of precedence depending on usage are hardly considered as definitely settled, and are in a great measure left to the discretion of the officers of arms. The Sovereign of course is always first in order of precedence, after whom in descending order follow the Prince of Wales, sons of the Sovereign, grandsons of the Sovereign, brothers of the Sovereign, uncles of the Sovereign, the Sovereign's brothers' or sisters' sons, the Archbishop of Canterbury, the Lord High Chancellor, and so on through the high state dignitaries, the various ranks of the peerage, &c. The order of precedence among women follows the same rules as that among men. By the acts of Union of Scotland and Ireland the precedence in any given degree of the peerage has been established as follows:—1. Peers of England; 2. Peers of Scotland; 3. Peers of Great Britain; 4. Peers of Ireland; 5. Peers of the United Kingdom and Peers of Ireland created subsequent to the Union.

Prec'edent, in law, a judicial decision which serves as a rule for future determinations in similar cases. Precedents, strictly

speaking, are binding on tribunals only when they are actual decisions of the point in question; what is termed an extrajudicial opinion or *obiter dictum*—the opinion of a judge pronounced where it was not called for to decide the issue—can have authority only from the character of the judge, and not as a precedent. Precedents are now of as much authority in courts of equity as in those of common law.

Precentor, in old religious foundations, an important official in a chapter, whether cathedral or collegiate, who led the singing. He ranked generally, although not universally, next to the dean; but in modern cathedral foundations he is usually a minor canon, and in consequence has lost much of his prestige. He is still, however, everywhere the conductor of the choral service, and superintendent of the choir.

Precep'tory, in mediæval history, a religious house of the Knights Templars, subordinate to the temple or principal house of the order in London. It was under the government of one of the more eminent knights appointed by the grand-master.

Precession of the Equinoxes, a slow motion of the line of intersection of the celestial equator or equinoctial and the ecliptic, which causes the positions occupied by the sun at the equinox (the equinoctial points, which see) to move backward or westward at the mean rate of 50·25″ per year. This motion of the equinox along the ecliptic carries it, with reference to the diurnal motion, continually in advance upon the stars; the place of the equinox among the stars, with reference to the diurnal motion, thus precedes at every subsequent moment that which it previously held, hence the name. This sweeping round in the heavens of the equinoctial line indicates a motion of the axis of rotation of the earth, such that it describes circles round the poles of the ecliptic in 25,791 years. Nutation (L. *nutatio*, a nodding) is a similar, but much smaller gyratory motion of the earth's axis, whose period is about nineteen years. From these two causes in combination the axis follows a sinuous path, instead of a circle, about the pole of the ecliptic. Nutation causes the equinoctial points to be alternately in advance of and behind their mean place due to precession by 6·87″. At present the vernal equinoctial point is in the zodiacal sign Pisces, and it is moving towards the sign Aquarius.

Precious Metals, a name commonly applied to gold and silver in contradistinction to such ordinary and abundant metals as iron, copper, lead.

Precious Stones. See *Gems.*

Precipitate, in chemistry, a solid body produced by the mutual action of two or more liquids mixed together, one or other of them holding some substance in solution. The term is generally applied when the solid appears in a flocculent or pulverulent form. Substances that settle or sink to the bottom like earthy matters in water are called sediments, the operating cause being mechanical, not chemical. Red oxide or peroxide of mercury is often called *red precipitate.*

Precognition, in Scots law, the examination of a witness at some time previous to his appearance in court. Precognitions may be taken in civil or criminal cases, and may be taken by the agents or counsel for any of the parties. In criminal trials the precognitions for the crown are generally taken by the procurator-fiscal, and the signature of the witness is affixed; but those acting for the defence may take precognition from the crown witnesses also if they please. Precognitions are rarely taken in presence of a magistrate, or on oath.

Predestination, in theology, the term used to denote the decree of God, whereby the elect are foreordained to salvation. The theory of predestination represents God's absolute will as determining the eternal destiny of man, not according to the foreknown character of those whose fate is so determined, but according to God's own choice. This doctrine has been the occasion of many disputes and controversies in the church in all ages. On the one side, it has been observed that the doctrine of predestination destroys moral distinction, introduces fatalism, and renders all our efforts useless. On the other side, it is contended that if God's knowledge is infinite he must have known everything from eternity; and that the permission of evil under such circumstances is indistinguishable from a plan or decree under which it is foreordained. The first great champions of these opposite views were Pelagius and Augustine. The former held that there was a possibility of good in man's nature, and that the choice of salvation lay in man's will. Augustine maintained that apart from divine grace there is no possibility of good in human nature, and that since the fall man's will has no power of choice. Predestination

forms one of the peculiar characteristics of the Calvinistic theology; the question is left an open one by the Anglican Church, and also by the Roman Catholic Church since the Reformation.

Predicables, in logic, are terms affirmable, as predicates, of other terms. The predicables are said to be five: genus, species, difference, property, and accident. The first two name the higher and lower classes of the things classified: a genus includes more than one species. The other three express the attributes on which the classification is founded.

Predicament. See *Category*.

Predicate. See *Logic, Quantification*.

Pre-existence, Doctrine of, the doctrine sometimes maintained that the soul of every man has an existence previous to that of his body. This opinion was very prevalent in the East, and was held by several Greek philosophers, more especially by the Pythagoreans, Empedocles, and also apparently by Plato. A similar doctrine has found some countenance in Christian times as an explanation of the union of soul and body. In favour of this theory appeal is made to these peculiar sensations which are sometimes raised by sights or sounds, which we feel conscious of having had a former familiarity with, though reason would persuade us we had seen them for the first time. The doctrine is supported by some modern German philosophers, particularly the younger Fichte.

Préfet (prā-fā; L. *præfectus*), the title of an important political functionary in France, whose office was created in 1800 at the instance of Napoleon. There is a préfet at the head of each department, who is intrusted with the whole organization and management of the police establishments; but not with the punishment of police offences. Within this sphere of action the préfets are unchecked; the sous-préfets, who are appointed by them, and who stand at the head of the districts, are entirely subject to their commands; and the authorities of the communes, as well as the justices of the peace, can set no limits to their activity. In time of tumult they can call out the military, or provisionally declare a state of siege. The council of the préfecture is a court in which are settled all disputes respecting the taxation of individuals, engagements with the state for building, the indemnification of those who have had to give up anything to the public, &c. Of this court the préfet is president, and in it he has a casting-vote. The appeals against its decisions lie to the council of state.

Pregnancy, the state of a female who is with child. It lasts in the human subject from 274 to 280 days; that is to say, that time should elapse from the moment of conception to the time of birth. Among the earliest signs of pregnancy are the stoppage of the monthly discharge, and sickness, usually felt in the early part of the day, and thus called 'morning sickness.' The latter usually begins about the fourth or fifth week, and may last all the time, but often diminishes in course of the fourth month. Changes in the breast are evident during the second month, the nipple becoming more prominent, and the dark circle round it being deeper in tint by the ninth week, little elevated points in it being more marked. Towards the fourth month enlargement of the belly becomes noticeable, and continues to increase regularly till delivery takes place. About the sixteenth or seventeenth week quickening occurs; that is, the mother becomes aware of movements of the child. None of these signs are, however, absolutely conclusive, as various conditions may give rise to similar signs or signs resembling them. The only conclusive evidence is the detection of the sounds of the child's heart, heard by applying the ear to the belly of the mother, midway between the navel and the line of the groins, a little to the right or left of the middle line. They may be detected about the eighteenth week. During pregnancy women should take regular meals of plain, nourishing food, avoiding rich and highly-seasoned dishes, and should restrain unwholesome cravings, which sometimes exist. Gentle but regular and moderate exercise should be engaged in, all undue exertion, effort, and fatigue being avoided. Clothing should be warm, woollen next the skin, and *nowhere tight*. Prudence in baths must be exercised, too hot or too cold water being avoided, and the bowels must be kept well regulated, only the mildest medicine being used. Above all a calm and equable frame of mind should be cultivated, and there should be no hesitation in asking advice of the doctor.

Pregnancy, Concealment of, in Scots law, was originally made a crime in 1690 by statute, and punishable with death, as described in Sir Walter Scott's novel The Heart of Midlothian. In 1809 the punishment was

modified to two years' imprisonment. The concealment must be interpreted very strictly, communication of the fact of pregnancy to any one at any time, even by clear inference only, is sufficient to rebut the accusation. In indictments for child-murder concealment of pregnancy is usually inserted as an alternative charge. The crime is not known to the law of England.

Prel'ate, in church law, one of those spiritual dignitaries who exercise jurisdiction in their own name. These were originally only the bishops, archbishops, patriarchs, and the pope. The cardinals and legates, abbots and priors, also obtained certain privileges of jurisdiction by grant or prescription. The term is now commonly used merely to signify one of the higher dignitaries of the church.

Pre'lude, in music, originally the first part of a sonata; though, as the name implies, it may be an introduction to any piece of music. Bach and his contemporaries elaborated preludes considerably; and Chopin wrote several piano works which, though complete in themselves, he designated preludes. Latterly the term has been applied to operatic introductions when they are shorter than the usual overture. Wagner in particular has prefaced most of his operas with a prelude.

Premises. See *Logic, Syllogism.*

Premonstratensians, or NORBERTINES, a religious order, founded at Prémontré, near Laon in France by St. Norbert in 1120, who gave them the rule of St. Augustine with some additional rigour. The order was introduced into England in 1146, and its members were there regularly known as the White Canons. Before the Reformation they had 2000 monasteries, among which were 500 nunneries, mostly in Germany, the Netherlands, France, England, and the north of Europe; but the Reformation diminished this number by more than one-half in the 16th century. The order is now very small.

Prenzlau (prents'lou), a town in Prussia, prov. Brandenburg, on the Ucker, 57 miles north by east of Berlin. It is an old town, and possesses a handsome Gothic church and a gymnasium. Pop. 16,933.

Preposition (from L. *præpositus*, placed before), a part of speech which is used to show the relation of one object to another, and derives its name from its being usually placed before the word which expresses the object of the relation. In some languages this relation is often expressed merely by changes of the termination.

Presburg. See *Pressburg.*

Presbyo'pia, or PRES'BYOPY, that is, 'old-sightedness,' an affection of the eye common at an advanced stage of life; its effect is to render objects near the eye less distinct than those at a distance. Persons affected with presbyopia generally have to use convex spectacles.

Pres'byter (Gr. *presbyteros*, an elder), an office-bearer in the early Christian Church, the exact character and position of whom is differently regarded by different authorities. Presbyterians generally maintain that originally *bishop* and *presbyter* were one and the same; Episcopalians generally maintain that from the first they were different, as was certainly the case in very early times. By the end of the 2d century the presbyters held a position in connection with the congregations intermediate between that of bishop and deacon, and represented the priests or second order of clergy.

Presbyte'rians, a name applied to those Christians who hold that there is no order in the church as established by Christ and his apostles superior to that of presbyters (see *Presbyter*), and who vest church government in presbyteries, or associations of ministers and elders, possessed all of equal powers, without any superiority among them. The Presbyterians believe that the authority of their ministers is derived from the Holy Ghost by the imposition of the hands of the presbytery; and they oppose the Independent scheme of the common rights of Christians by the same arguments which are used for that purpose by the Episcopalians. They affirm that all ministers, being ambassadors of Christ, are equal by their commission; and that Episcopacy was gradually established upon the primitive practice of making the moderator, or speaker of the presbytery, a permanent officer. These positions they maintain against the Episcopalians by the general argument that the terms bishop and presbyter are used as synonymous terms in the New Testament, and that they were used simply to designate the minister appointed by the apostles to take charge of a new church on its foundation. They therefore claim validity for the ordination after the Presbyterian form, as there was originally no higher ecclesiastic than a presbyter in the church.

The first Presbyterian church in modern times was founded in Geneva by John Calvin about 1541; and the constitution and doctrines were thence introduced, with some

modifications, into Scotland by John Knox about 1560, though the Presbyterian was not legally recognized as the national form of church government until 1592. For nearly a century after this date there was a continual struggle in Scotland between Episcopacy and Presbyterianism; until ultimately by the Treaty of Union in 1707 it was agreed on the part of England and Scotland that that form of church government should be the national form of ecclesiastical government in Scotland, and that the Scotch Church should be supported as the only one established by law.—The constitution of the Scotch Church, and of the Presbyterian Church generally, is as follows:—The kirk-session is the lowest court, and is composed of the parochial minister, or ministers, if more than one, and of lay elders (usually from six to twenty); the minister, or senior minister where there are more than one, being president or moderator. This court exercises the religious discipline of the parish; but an appeal may be made from its decisions to the presbytery, and again from the presbytery to the synod. A presbytery consists of the pastors of the churches within a certain district, and of an elder connected with each, while the synod comprises the presbyteries within a certain area, their ministers and representative elders. (See *Presbytery, Synod.*) The General Assembly is the highest ecclesiastical court, its decisions being supreme. (See *Assembly, General.*) Besides the Established Church of Scotland there are other important religious bodies whose constitution is strictly Presbyterian, but who, from different principles, decline being connected with, or receiving any emoluments from the state. The chief of these are the Free Church and the United Presbyterian Church.

Shortly after the Reformation Presbyterianism was in considerable strength in England, a large number of the Puritans preferring this system to episcopacy; but it subsequently declined in strength. The rule of the Stuarts, however, did much to renew its vigour, and in 1642 the Long Parliament abolished episcopacy, a measure followed by the meeting of the famous Assembly of Divines at Westminster the following year. In 1646 presbytery was sanctioned by parliament, but it was never generally adopted, or regularly organized, except in London and Lancashire. Soon after the Restoration episcopacy was restored, and about 2000 Presbyterian clergy were ejected from their cures in consequence of the Act of Uniformity in 1662. Presbyterianism has ever since been simply one of the forms of dissent in England, and has held no prominent position, though many Presbyterian churches are scattered throughout England. Of these by far the greater number are united to form a single body, the Presbyterian Church of England.—The Presbyterian Church in Ireland originated through the settlement of Scottish colonists in Ulster in the reign of James I. When Charles II. attempted to force Prelacy upon the Scotch many of them took refuge in the north of Ireland, which gave the cause of Presbyterianism in that country a fresh impulse. The favour shown them by William III. was of great assistance to them; which they repaid by the part they played in the rebellion under James II., particularly in the memorable siege of Londonderry. As a test of his gratitude the king doubled the sum given for the support of their ministers, hence known as Regium Donum; the act of 1869, however, which disestablished the Irish Church, provided also for the discontinuance of this sum.—The Presbyterian Church of the United States is undoubtedly to be reckoned as a daughter of the Church of Scotland. There are at present a number of different organizations of Presbyterians in the States; and the body is also an important one in Canada and the other British colonies, and on the European continent.

Pres'bytery, a judicatory, consisting of the pastors of all the churches of any particular Presbyterian denomination within a given district, along with their ruling (*i.e.* presiding) elders, there being one ruling elder from each church-session commissioned to represent the congregation in conjunction with the minister. The functions of the presbytery are, to grant licenses to preach the gospel, and to judge of the qualifications of such as apply for them; to ordain ministers to vacant charges; to judge in cases of reference for advice, and in complaints and appeals which come from the church-sessions within the bounds of the presbytery; and generally to superintend whatever relates to the spiritual interests of the several congregations under its charge, both in respect of doctrine and discipline. Appeals may be taken from the presbytery to the provincial synod, and thence to the general assembly.

Prescot, a manufacturing and market town in England, county of Lancaster, 8 miles

east of Liverpool. Prescot has long been noted for the manufacture of watch-tools, watch-movements and hands, small files, &c. Earthenware, glass bottles, &c., are also manufactured. Pop. 6745.

Prescott, WILLIAM HICKLING, American historian, born in Salem, Massachusetts, 1796; died 1859. His father was a lawyer, the son of Colonel William Prescott, who commanded the American forces at the battle of Bunker's Hill. In 1811 he entered Harvard College, and graduated in 1814. While at college he met with an accident to his left eye, completely depriving him of its use for ever afterwards, and rendering the other eventually so weak that during the latter half of his life he could scarcely use it. After two years spent in travelling through England, France, and Italy, chiefly for health, he returned to his native country, where he married, and set himself assiduously to literary labour. The earliest fruits of this were contributions to the North American Review; and for many years his only productions were essays and magazine articles. Acquaintance with Spanish literature, which he began to cultivate in 1824, led him to attempt his first great work on Spanish history, the Reign of Ferdinand and Isabella, published 1837. It was received with enthusiasm both in America and Europe; was rapidly translated into French, Spanish, and German; and its author was elected a member of the Royal Academy at Madrid. Prescott's next work was the History of the Conquest of Mexico, with a Preliminary View of the Ancient Mexican Civilization, and the Life of the Conqueror Hernando Cortez, which appeared in 1843, and was received with an equal degree of favour. In 1847 he published the History of the Conquest of Peru, with a Preliminary View of the Civilization of the Incas. In 1855 the first two volumes of the long-expected History of the Reign of Philip II., King of Spain, appeared, and proved to the public equally acceptable with Prescott's former works. In 1858 was published a third volume; but the sudden death of the author from apoplexy put a stop to his labours. Prescott affords a remarkable instance of the success of indomitable industry and perseverance, carried out in spite of the affliction of partial and latterly almost total blindness.

Prescription, in law, is a right or title acquired by use and time; the object being to secure the title to property to him who has had the possession of it for the term fixed by the law, and to prevent any one from disturbing his possession after such term has expired. In the English common law the term *prescription* is applied only to incorporeal hereditaments, as a right of way, a common, &c., and requires immemorial time to establish it. This rule was modified, however, by the passing of the statute 2 and 3 William IV. cap. lxxi., which provides that no right of common shall be defeated after thirty years' enjoyment, and after sixty years the right is deemed absolute and indefeasible, unless had by consent or agreement. In claims of right of way, of water-course, and similar easements, the periods are twenty and forty years. Claims to the use of light to any dwelling-house or building enjoyed for twenty years are indefeasible, unless shown to have been by consent.

By the law of Scotland prescription has a much wider operation than by the law of England. It not only protects individuals from actions which other parties might have brought against them, but in some instances creates a positive title to property. The prescription by which a right of property can be established is that of forty years. Whatever adverse right is not cut off by the other special prescriptions of shorter periods is destroyed by the long prescription, as this is called. To create a title to real property, the long prescription must be both positive and negative. The party holding the property must have been forty years in unchallenged possession, and be able to show a *prima facie* valid title; while a claimant must have been forty years without an ostensible title, and must, by not legally challenging it, have tacitly acquiesced in the possessor's title. The other and shorter prescriptions are as follows:—The vicennial, applicable to holograph writings not attested with the usual formalities; the decennial, applicable to actions against tutors and curators; the septennial, applicable to actions against cautioners; the sexennial, applicable to bills of exchange or promissory notes; the quinquennial, which cuts off all right of action on verbal contracts, and arrears of rent in an agricultural lease; the triennial or three years' prescription, which cuts off claims for ordinary accounts, servants' wages, &c. By Scotch law also, but not by English, a vicennial prescription applies to crimes, no prosecution being competent after a period of twenty years.

Prescription, in medicine, is the form, with directions, in which a medicine or medicines are ordered or prescribed by a medical man. The several medical substances which may be contained in a prescription are distinguished by names indicative of the office performed by each. These are—1. The *basis*, which is the principal or most active ingredient. 2. The *adjuvant*, or that which is intended to promote the action of the basis. 3. The *corrective*, intended to modify its action. 4. The *excipient*, or that which gives the whole a commodious or agreeable form. To these certain writers add a fifth, the *intermedium*, which is the substance employed to unite remedies which do not mix with each other or with the excipient, such as yolk of eggs and mucilage, employed in the preparation of emulsions. In choosing the form of a prescription it should be borne in mind that solutions and emulsions generally act with more certainty and rapidity than powders diffused through water; and these again than the semi-solid and solid forms of medicine. See also *Pharmacy*.

Presentation, the nomination of one or several candidates to a vacant office; commonly used in the case of a patron to a church. In England the clergyman is presented to the bishop to be instituted in a benefice; in Scotland, before the abolition of church patronage, he was presented to the presbytery for induction.

Presentment, in law, is properly speaking the notice taken by a grand-jury of any offence, from their own knowledge or observation, without any bill of indictment being laid before them at the suit of the crown.

Preserved Provisions, PRESERVES. The preservation of dead organized matter from the natural process of decay is a most useful means of increasing and diffusing the food supply of the world. Animals, vegetables, and fruits may all be easily preserved for this purpose. The preserving of fruits is an old and familiar process. This is generally effected by boiling or stewing, though drying is also frequently resorted to, where the fruit is meant to be kept intact. Fruits intended for confectionery are preserved in four different ways—1. In the form of jam, in which the fruit is boiled with from one-half to about equal its weight of sugar. 2. In the form of jelly, in which the juice only is preserved, by being carefully strained from the solid portions of the fruit, and boiled with a third to a half of its weight of sugar. 3. By candying, which consists in taking the fruits whole or in pieces, and boiling them in a clear syrup of sugar previously prepared. They absorb the syrup, which is then crystallized by the action of a gentle heat. 4. By stewing them in a weak syrup of sugar and water till they become soft but not broken, and transferring them with the syrup to jars, adding pale brandy equal in quantity to the syrup. Several kinds of vegetables, as cabbages, cucumbers, cauliflowers, onions, are preserved by pickling. (See *Pickles*.) Antiseptics are used to preserve meat also, salting being the most common process. But to preserve large quantities of vegetable and animal products for food purposes, and at the same time to keep them nearly in their fresh state, they must be subjected to one of three processes. These are—drying, refrigeration, and exclusion of air. With vegetables, which contain so large an amount of water in proportion to their solid and nutritious material, the process of drying is peculiarly applicable, and it is largely employed as the means of furnishing fresh vegetable food for ships in a compact and portable form, when, in addition to desiccation, compression is also employed.

The preservation of articles of food by the application of cold is the simplest of all known methods, and in such climates as North America, Russia, &c., it is largely taken advantage of; while of late it has generated a large and increasing trade between Britain and the Australian colonies. In 1875 ice began to be used to preserve fresh meat in considerable quantities, which was sent from America to Europe. In 1879 the invention of the Bell-Coleman refrigerator increased immensely the facilities for such a traffic. This invention has been succeeded by others, chief among them being the Haslam refrigerator; and the result is that the distribution of meat over the surface of the globe is being revolutionized. The trade between Great Britain and New Zealand in fresh mutton is now immense. The modern methods of refrigeration for carrying purposes consist of an air-tight room on board ship, where the meat is kept, and through which dry cold air is made to circulate by means of special machinery driven by steam, the air being first compressed and cooled, and a further cooling taking place when it is again allowed to expand.

The process of preservation by exclusion from the action of atmospheric air is yearly assuming more importance and being more largely practised. The most perfect method,

and that which is now most generally resorted to, is the inclosure of the food in air-tight cases from which the air is then expelled; upon the perfection of the air-excluding process depends entirely the preservation of the article. The first successful attempt to preserve fresh meat in this way was made in 1809 by M. Appert, a Frenchman. The plan now generally adopted is commonly known as *canning*, and is applicable alike for flesh-meats, vegetables, and fruits. The process is usually as follows:— The provisions of whatever kind are packed into a tin cylinder, and the interstices filled in with water or other appropriate fluid, as gravy in the case of flesh-food. The lid, which is perforated with a small aperture or pin-hole, is soldered carefully down. The cases are then set in a bath of solution of chloride of calcium; heat is applied until the whole boils, and the air is thus expelled through the pin-holes. These holes are then hermetically closed, and the canister and its contents are once more subjected to the operation of heat until the provisions are perfectly cooked. When it has become cool the canister is coated over with paint and removed to the proving room, an apartment the temperature of which has been raised to the degree of temperature most favourable to decomposition. If the operation has been successfully performed, the ends or sides of the canisters will have fallen in to some extent from the outward pressure of the air. If, after the interval of some days, the ends bulge out, it is a certain sign that the process has not been successful, the liberated gases causing the outward pressure. Such cases should be rejected or submitted again to the process. Not only may boiled provisions be preserved in this way, but roast meats also. An improvement on this process has been effected by introducing into the canisters a small quantity of sulphite of soda, which causes the absorption of any traces of free oxygen which may lurk in the cases.

Pres'ident, signifying he who presides, has several special and technical senses. It is used for (1) the principal member of a society or association, who takes the chair when present at meetings; (2) the chief official of a company or board; (3) the head of a university or college, or of a learned faculty; (4) the elected chief of a republic. In England, the Lord-president of the council, the chief of the privy-council, is an officer of state whose duty is to act as a sort of intermediary between the sovereign and the council. In Scotland, the Lord-president of the Court of Session is the presiding judge in the supreme court.

Press, Correction of the. See *Correction of the Press.*

Press, Liberty of the, the liberty of every citizen to print whatever he chooses, which at the same time does not prevent his being amenable to justice for the abuse of this liberty. The right of printing rests on the same abstract grounds as the right of speech, and it might seem strange to a man unacquainted with history that printing should be subjected to a previous censorship, as it is in some states, and has been in all, any more than speaking, and that the liberty of the press should be expressly provided for in the constitutions of most free states. But when we look to history we find the origin of this, as of many other legislative anomalies, in periods when politics, religion, and individual rights were confusedly intermingled. It is only since men's views of the just limits of government have become clearer that the liberty of the press has been recognized as a right; and to England we are particularly indebted for the establishment of this principle. The existence of a censorship of the press was for centuries, however, deemed an essential to the safety of all European governments. Liberty of printing, as we understand it, is a comparatively modern notion; Milton's plea for a free press met with no response from his own party, nor for very many years later was it the cue of any party in the English commonwealth to refrain from suppressing the writings of their political opponents. In England the liberty of the press, soon after printing was introduced, was regulated by the king's proclamations, prohibitions, charters of license, &c., and finally by the court of Star-chamber. The Long Parliament, after their rupture with Charles I., assumed the same power. The government of Charles II. imitated their ordinances, and the press did not really become free till the expiration of the statutes restricting it in 1693, after which it was found impossible to pass new laws in restraint of it, and it has remained free ever since, the last restriction being done away with on the abolition of the newspaper stamp duty, in 1856. Such legal checks as remain are merely intended to prevent outrages on religion or decency, to protect subjects from defamation, and to conserve the copyright of authors. The

constitutions of many of the United States declare, as we should expect, for liberty of the press. The same may be said of all the South American republics. Among European countries, it may be generally said the liberty of the press is found most predominant among the weaker powers, such as Spain, Turkey, Sweden and Norway, Switzerland, and Roumania; in France the press may be said to be comparatively free; while in Germany, Austria, and particularly in Russia, there are still many restrictions. In the British colonies the law is as in England, but in India the governor-general exercises a censorship. See *Books* (*Censorship of*).

Press, PRINTING. See *Printing*.

Pressburg, or PRESBURG, a town in Hungary, 35 miles east of Vienna, beautifully situated on the left bank of the Danube, and on spurs of the Little Carpathians. The most striking edifice is the ruined royal palace, on the top of an eminence, burned in 1811. The cathedral is a large Gothic structure, dating from the 11th century, which has latterly been considerably modernized; here the kings of Hungary were crowned. The Franciscan church (13th century) is also noteworthy. There are also several palaces, including that of the primate of Hungary. The river is here crossed by a bridge of boats. The manufactures are various. The trade, particularly transit, and chiefly in corn and timber, is extensive. Pressburg is a place of very great antiquity, and was long a fortress of some strength. In 1541, when the Turks captured Buda, it became the capital of Hungary, and retained the honour till the Emperor Joseph II. restored it to Buda. The treaty by which Austria ceded Venice to France and the Tyrol to Bavaria was signed here in 1805. Pop. 52,411, fully more than half of whom are Germans, and 5400 Jews.

Pressensé (prā-sȧn-sā), EDMOND DE, D.D., French Protestant minister, born at Paris 1824. After studying under Vinet at Lausanne, and at Halle and Berlin, he became pastor of Taitbout Chapel, Paris, where he gained a high reputation as a preacher. He sat in the National Assembly (1871–75), and was made life senator in 1883. He is the author of many religious works—historical, evangelical, &c., some of which, including his Life of Christ, have been translated into English. He died in 1891.

Press-gang, the name given in England to a detachment of seamen who (under a naval officer) were empowered, in time of war, to lay hold of seafaring men and compel them to serve in the king's ships.

Prester John (PRIEST or PRESBYTER JOHN), a legendary personage of some note. In the middle ages it was reported by travellers that there was a Christian prince who reigned in the interior of Asia under this name, and the same story was also known to the Crusaders. Who this Prester John was it is not easy to decide; the supposition that he was the Dalai Lama, or one of the chief priests of the Lamaites, does not agree with the position assigned to his residence by travellers. The Portuguese in the 15th century picked up a story of a Christian prince in Central Africa, and by some confusion of names they transferred thither the throne of Prester John. Hence in recent times the home of this mythical prince and priest has always been laid in Abyssinia.

Presto (Italian), quick, used in music to designate a faster rate of movement than is indicated by *allegro*. *Presto assai* denotes very quick, and *prestissimo* the highest degree of quickness.

Preston, a municipal and parliamentary borough of England, in Lancashire, 27 miles north-east of Liverpool, agreeably situated on a height above the right or north bank of the Ribble, near the head of its estuary. The environs of the town exhibit much pleasing scenery, and the town possesses three fine public parks. Among the churches Christ Church is admired for the purity of its Norman architecture; the parish church, which has been rebuilt in the decorated style of the 14th century, is also a fine building; and one of the Roman Catholic churches, St. Walburga's, is considered the finest in the town. The town-hall is a fine structure; and generally the architecture of Preston is good. The river is spanned by five bridges, two of them railway bridges, one of which cost £40,000. The railway-station (recently reconstructed) is very large, and is one of the most important junctions on the London and North-western Railway. The original staple manufacture of the town was linen, which is still woven to some extent, but has been completely eclipsed by the cotton manufacture, of which Preston is now one of the chief centres. Preston also has machine-shops, iron and brass foundries, railway-carriage works, breweries, malt-houses, roperies, tanneries, &c. Some shipping trade is carried on, and extensive harbour and river

diversion works recently carried out at a cost of about £800,000 have already considerably increased the trade of the port. In 1323 Preston, originally Priest's-town, was taken and burned by Robert Bruce; in the great civil war it espoused the Royalist cause, and was twice captured by the Parliamentarians; in the rebellion of 1715 it was occupied by the Jacobite forces; in that of 1745 the Highlanders, headed by the Pretender, passed through Preston both on their march to London and on their retreat. Preston was the birthplace of Arkwright. It returns two members to parliament. Pop. county bor. 107,573; parl. bor. 111,696.

Prestonpans, a small town in Scotland, in the county of Haddington, near the south shore of the Firth of Forth. It used to have a flourishing manufacture of salt: hence the name. In the vicinity is the scene of the famous battle in 1745, when the Jacobites defeated Sir John Cope and the royal forces. Pop. 2224.

Prestwich, a town of England, in Lancashire, 4 miles north-west of Manchester, a favourite residence of Manchester merchants. Pop. 7869.

Presumption, in law, is the assuming of a fact or proposition as true, and is of two kinds, *præsumptio juris* and *præsumptio juris et de jure*. The *præsumptio juris* is a presumption established in law till the contrary be proved, *e.g.* the possessor of goods is presumed to be the owner. The *præsumptio juris et de jure* is that where law or custom establishes any proposition that cannot be overcome by contrary evidence, as the incapacity in a minor with guardians to act without their consent.

Pretender. See *Charles Edward Stuart*, and *Stuart* (*James Edward Francis*).

Pretoria, the capital of the Transvaal or S. African Republic, lies in a valley, 4500 feet above sea-level, 1040 miles by railway from Cape Town, 349 from Delagoa Bay. There are government buildings (cost £200,000), English cathedral and other churches, market buildings, museum, several banks, &c. Pop. about 12,000.

Prevention of Crimes Act (1871) provides for the keeping of a register of criminals, with photographs of those convicted of crime, for bringing under police supervision persons twice convicted, &c.

Prevention of Cruelty to Animals. See *Animals* (*Cruelty to*).

Prev'esa, a fortified town of European Turkey, in the pashalic of Janina, on the northern side of the Gulf of Arta, 18 miles south-west from Arta. It has a stormy history, having been frequently blockaded and captured, and on one occasion pillaged by the Turks, it being then under France. Pop. about 7000.

Prévost D'Exiles (prā-vō deg-zēl), **Antoine François**, a French writer, born in 1697. Originally a member of the Jesuit order, he soon quitted it for the military service. After alternating several times between the church and the army, he gave up both professions, and in 1729 he went to Holland, where he published his Mémoires d'un Homme de Qualité. After a sojourn of two years in England he returned to France, and was appointed almoner and secretary to the Prince of Conti. From this period till his death in 1763 he pursued an active literary life, editing a journal called Pour et Contre, and publishing many romances, of which the best known are the Histoire de M. Cleveland, and the Histoire du Chevalier des Grieux et de Manon Lescaut.

Prévost-Paradol (prā-vō-pà-rà-dol), **Lucien Anatole**, a French writer and member of the Academy, was born at Paris 1829. In 1855 he obtained the chair of French literature in the faculty of Aix, but soon resigned, and next year became one of the editors of the Journal des Débats, a paper with which he never broke his connection. In 1870 he went as ambassador to the United States; but soon after his arrival put an end to his own life—his mind being, it is believed, unhinged by the news of the declaration of war by France against Prussia. He wrote Études sur les Moralistes Français, Essai de l'Histoire Universelle, La France Nouvelle, Du Rôle de la Famille dans l'Éducation, &c.

Pri'am, in Greek legend, the last king of Troy, the son of Laomedon. By his second wife, Hecuba, he had, according to Homer, nineteen children, the most famous being Hector, Paris, Cassandra, and Troilus. His name has been rendered famous by the tragical fate of himself and his family, as a result of the Trojan war. When he was extremely old the Greeks demanded of him the restoration of Helen, who had been carried away by Paris, and on his refusal to give her up they made war against Troy, and took and destroyed the city, after a siege of ten years. Homer gives no account of the death of Priam; but other poets represent him to have been slain at the altar of Zeus by Pyrrhus the Greek.

Pria'pus, a Greek deity, the deformed son of Dionysus and Aphrodite, a god of gardens, fruits, &c., considered by mythologists to represent fertility in nature. He was worshipped in all parts of Greece, and also in Rome.

Pribram (prshē'bràm), a town of Central Bohemia, in a district where are rich lead and silver mines. Pop. 11,020.

Prib'ylov, or **Pribyloff, Islands**, a group of islands on the coast of Alaska, U.S., in Behring Sea. The largest are St. Paul, St. George, Walrus, and Beaver Islands. They are frequented by numbers of fur-seals. The natives are Aleutians.

Price. See *Value.*

Price, Richard, English religious and economical writer, born 1723; for most of his life a pastor to various Dissenting churches in the metropolis. He commenced his literary career in 1758 by his Review of the Principal Difficulties in Morals, which was followed by Four Dissertations on the Importance of Christianity, the Nature of Historical Evidence, and Miracle, &c. (1767). In 1769 he received the diploma of D.D. from the University of Glasgow, having four years previously been chosen a fellow of the Royal Society. In 1771 appeared his Observations on Reversionary Payments and Annuities, and later the celebrated Northampton Mortality Tables. He also published a number of political tracts, in one of which he advocated the cause of the American colonies in 1776. When Pitt became prime-minister he consulted Dr. Price in his schemes for the reduction of the national debt, and the establishment of the sinking fund was the result of his recommendation. At the commencement of the French revolution, in a sermon (published in 1789) On the Love of Country, he warmly expressed his delight at the emancipation of the French people. This discourse produced Burke's Reflections, in which Dr. Price was severely treated. He died in London in 1791.

Prichard, James Cowles, ethnologist, born at Ross, in Herefordshire, in 1785; died at London 1848. He studied medicine, and took the degree of M.D. at Edinburgh; commenced practice as a medical man at Bristol, and in 1810 received the appointment of physician to the Clifton Dispensary and St. Peter's Hospital. In 1813 he published his great work, Researches into the Physical History of Mankind, and in 1843 appeared his Natural History of Man. He wrote many minor works on ethnology, besides treatises on various medical subjects. In 1845 he left Bristol for London, where he died.

Prickly Ash, a name given to several prickly shrubs of the United States, genus *Xanthoxylum*, order Rutaceæ. They have an aromatic and pungent bark, which from being used as a remedy for toothache gains them the name of *toothache-tree.*

Prickly Heat, the popular name of an eruptive skin disease occurring in hot weather or in hot climates. One variety of it is a kind of lichen. See *Lichen.*

Prickly Pear, *Opuntia vulgāris*, natural order Cactaceæ, otherwise called Indian fig. The opuntia is a fleshy and succulent plant, destitute of leaves, covered with clusters of spines, and consisting of flattened joints inserted upon each other. The fruit is purplish in colour, covered with fine prickles, and edible. The flower is large and yellow. It is a native of the tropical parts of America, whence it has been introduced into Europe, Mauritius, Arabia, Syria, and China. It is easily propagated, and in some countries is used as a hedge-plant. It attains a height of 7 or 8 feet.

Prickly Pear (*Opuntia vulgaris*).

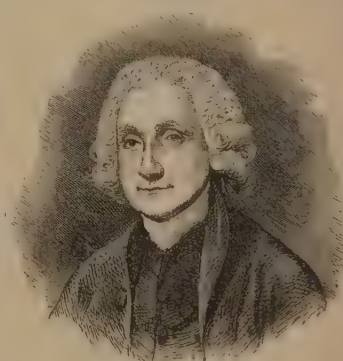
Prideaux (prī'dō), Humphrey, English divine, born in 1648. He was successively prebendary of Norwich, rector of Bladen, rector of Soham, archdeacon of Suffolk, vicar of Trowse, and dean of Norwich. His chief works were The Old and New Testaments Connected in the History of the Jews and Neighbouring Nations, and a Life of Mohammed. He died in 1724.

Pride of India. See *Melia.*

Priest (Hebrew, *kôhên;* Greek, *hiereus;* Latin, *sacerdos*), in its most general signification, a man whose function is to inculcate and expound religious dogmas, to perform religious rites, and to act as a mediator between worshippers and whatever being they worship. In some countries the priesthood has formed a special order or caste, the office being hereditary; in other countries it has been elective. In sacred history the patriarchal order furnishes an example of the family priesthood. Abraham, Isaac, and Jacob perform priestly acts, and 'draw

near to the Lord,' as also does Job, and the Arab sheikh to this hour unites in his person the civil and religious headship. The Mosaic priesthood was the inheritance of the sons of Aaron, of the tribe of Levi. The order of the priests stood between the high-priest on the one hand and the Levites on the other. (See *High-priest* and *Levites*.) The ceremony of their consecration is described in Exodus xxiv. and Leviticus viii. They wore a special dress, and their actions were in many cases prescribed strictly by the Mosaic law. Their chief duties were to watch over the fire on the altar of burnt-offerings, and to keep it burning continually; to offer a lamb morning and evening, and two lambs on the Sabbath, each accompanied with a meat-offering and a drink-offering at the door of the tabernacle. These were fixed duties which never varied, but their chief function was their being always at their post to do the priest's office for any guilty, penitent, rejoicing, or thankful Israelite. As their functions necessarily took up the greater part of their time, a distinct provision had to be made for them by tithes, a share of spoil taken in war, of the offerings, &c. On the settlement of the Jews in Canaan the priestly order had thirteen cities allotted to them, with pastures for their flocks. In the time of David the priestly order was divided into twenty-four courses, each of which was to serve in rotation for one week, while the further assignment of special services during the week was determined by lot. The division thus instituted was confirmed by Solomon, and continued to be recognized as the typical number of the priesthood. In the New Testament believers generally are regarded as having the character of priests, and it is held by many Protestants that the idea of a consecrated priesthood invested with sacrificial functions is repugnant to Christianity. In some churches, therefore, the name priest is not used, minister, pastor, &c., being the term employed instead. Those Christians, however, who, like the Roman Catholics, Greeks, &c., look upon the eucharist as a sacrifice, regard the priest as performing sacrificial duties, and as standing in a special relation between God and his fellow-men. The priests of the Church of Rome are bound to a life of celibacy; but in the Greek Church a married man may be consecrated a priest. In the Anglican and other Episcopal churches the priests form the second order of clergy, bishops ranking first. Diverse views of the priestly office are held in the Anglican and allied churches.

Priestley, JOSEPH, an English philosopher and divine, was born in 1733 near Leeds. His father was a clothier, of the Calvinistic persuasion, in which he was also himself brought up. At the age of nineteen he was placed at the Dissenting academy at Daventry, with a view to the ministry, where he spent three years. He there became acquainted with the writings of Dr. Hartley, which made a great impression upon his mind; and he was gradually led into a



Joseph Priestley.

partiality for Arianism. On quitting the academy in 1755 he accepted an invitation to become minister at Needham Market, in Suffolk, where he had to live as best he could on an average salary of £30 a year. His views did not, however, prove palatable to his congregation, who mostly deserted him, and in 1758 he undertook the charge of a congregation at Nantwich, in Cheshire, to which he joined a school. About this time he published his first work, The Scripture Doctrine of Remission. In 1761 he became a teacher in the Dissenting academy at Warrington, and while here wrote a History of Electricity, which gained him admission to the Royal Society, and the degree of LL.D. from the University of Edinburgh. In 1767 he became minister of the Mill Hill chapel at Leeds, where his religious opinions became decidedly Socinian. While here he published his History and Present

State of Discoveries relating to Vision, Light, and Colours (1772), his next important work being Institutes of Natural and Revealed Religion (1772–74). After a residence of six years at Leeds he accepted an invitation from the Earl of Shelburne, afterwards Marquis of Lansdowne, to reside with him as a companion in the nominal capacity of librarian, with a salary of £250; an appointment which gave him ample opportunities for prosecuting scientific research. In 1774 he discovered oxygen, or 'dephlogisticated air,' as he called it, a result which was quickly followed by other important discoveries in chemistry. Among his works belonging to this period are Experiments and Observations on Different Kinds of Air; An Examination of Dr. Reid's Inquiry into the Human Mind; Hartley's Theory of the Human Mind; The Doctrine of Philosophical Necessity; &c. Some of his philosophical works brought about differences between himself and his patron, and the connection was dissolved in 1780, Priestley retaining an annuity of £150 per annum. He next removed to Birmingham, where he became once more minister of a Dissenting congregation, and wrote History of the Corruptions of Christianity; History of Early Opinions concerning Jesus Christ; General History of the Christian Church; &c. Owing to his favourable opinions regarding the French revolution a mob assembled and set fire to Dr. Priestley's house, and in the conflagration his apparatus and manuscripts were destroyed. For this insane outrage he received compensation, but according to his own estimate too little by £2000. On quitting Birmingham he became president of the Dissenting college at Hackney, but was goaded by party enmity to seek an asylum in the United States in 1794. He took up his residence at Northumberland, in Pennsylvania, where he died in 1804. As a man of science he stands high, while as a theologian, and especially as a historical theologian, he ranks low. As a metaphysician he holds a respectable position. But his great natural powers were so distributed in attacking subjects the most varied that he never attained such excellence in any one branch as his talents deserved.

Prilu'ki, a town of Russia, in the government of Poltava, on the Udai. Pop. 15,231.

Prim, Juan, Marquis de los Castillejos, Count de Reuss, Field-marshal and Grandee of Spain, was born at Reuss, in Catalonia, 6th December, 1814. He was destined for the law, but on the outbreak of the civil war which followed the death of Ferdinand VII. (29th September, 1833) he joined the volunteers who had taken up arms in the cause of the infant queen Isabella, and rose so rapidly that in 1837 he was appointed a colonel in the regular army. When Queen Maria Christina quitted Spain he allied himself politically with the Progresista party, and vigorously opposed Espartero, who had assumed the regency, 8th May, 1841. During the next two years he was engaged in more than one insurrectionary movement. On the downfall of the Espartero ministry Prim was appointed by the queen a brigadier-general, and afterwards created Count de Reuss and governor of Madrid (1843). On the occasion of a democratic rising at Barcelona he was sent to restore order, but with little success. The revolt soon began to attain wide proportions, and Prim was accused of dilatoriness and dismissed from his command. In November 1844 he was brought to trial for his share in a conspiracy for the assassination of Narvaez, president of the council, and convicted and sentenced to six years' seclusion in a fortress, a sentence which was revoked by the queen in January 1845. After some years of service under the Turks he returned to Spain, and was in 1857 promoted to the rank of lieutenant-general, and in 1858 raised to the senate. In the following year war having broken out between Spain and Morocco, Prim was appointed to the command of the reserve, and his successes in this war gained him the title of Marquis de los Castillejos. In 1861 he was appointed to command the Spanish contingent, which, along with others from England and France, was sent out to Mexico, but he withdrew along with the English. In January 1866 he headed a revolt against the government of O'Donnell; but the insurrection was speedily suppressed, and he was compelled to take refuge in Portugal. After some years of seclusion he returned to Spain, and assisted greatly the movement which ended in the downfall of Queen Isabella; after which he was appointed minister of war, and exerted himself to find a suitable candidate for the Spanish crown. This was at last found in the person of Amadeo, duke of Aosta, second son of the King of Italy. On 28th December, 1870, Marshal Prim was shot by assassins, and died next day.

Pri'mage, a percentage on the amount of freight paid by shippers to the master of a

vessel, or more commonly to the owner or charterer, for the trouble of loading and unloading cargo.

Pri'mary, in geology, a term applied by the early geologists to rocks of a more or less crystalline structure, supposed to owe their present state to igneous agency. They were divided into two groups: *stratified*, consisting of gneiss, mica schist, argillaceous schist, hornblende schist, and all slaty and crystalline strata generally; and *unstratified*, these being chiefly granite. By geologists of the present day the term primary is used as equivalent to *palæozoic*, the name given to the oldest known group of stratified rocks, extending from the Pre-cambrian to the Permian formation. See *Geology*.

Primary Schools, the same as elementary schools. See *Education*.

Pri'mate, in the early Christian Church the title assumed by the bishop of the capital of a province, and hence equivalent to metropolitan. In Africa the title belonged to the bishop who had been longest ordained. In France the Archbishop of Lyons was appointed primate of the Gauls by Gregory VII. in 1079. In the German Empire the Archbishop of Salzburg was primate. In the Church of England both the archbishops still retain the title of primate, the Archbishop of Canterbury being distinguished as the primate of all England, and the Archbishop of York as the primate of England. In the Protestant Episcopal Church of Ireland the Archbishop of Armagh is primate, as formerly when the church was established.

Prima'tes (-tēz), the highest order or group of the Mammalia, including the orders Bimana and Quadrumana, and thus placing man, monkeys, apes, and lemurs in one great division.

Primaticcio (pre-ma-tich'ō), Francesco, Italian painter of the Bolognese school, born at Bologna in 1490, received his first instruction from Innocenzo da Immola, and completed his studies under Giulio Romano. In connection with several of the pupils of the latter he painted the Palazzo del Tè, in Mantua, from Giulio's designs. Through the recommendation of Frederick, duke of Mantua, Primaticcio was taken into the service of Francis I. of France in 1531. He did much to improve the palace at Fontainebleau, and gave a new impetus to French art. He made a collection of antique statues in Italy for Francis, and was appointed successor to Rosso as royal painter. He died in 1570.

Prime, in the Roman Catholic Church one of the canonical hours, and also the service in the breviary which falls to be performed at that time. The term is derived from the Latin *prima* (that is, *prima hora*, first hour), because prime begins with the first hour of the day according to the Eastern mode of reckoning, namely, 6 o'clock.

Prime Conductor, that part of an electric machine from which sparks are usually taken.

Prime Minister, or Premier. See *Ministers*.

Prime Number, a number which can be divided exactly by no number except itself and unity.

Priming, in steam-engines, the entrance of water spray along with steam into the cylinder of an engine. It always causes great annoyance. The use of muddy water, insufficient steam-room, carelessly constructed flues and pipes, &c., in the boiler, give rise to priming. Superheating the steam is one remedy. Priming valves, a species of spring valves, fitted to the cylinder, are so adjusted as to eject priming by the action of the piston.

Primogeniture, the right of the eldest son and those who derive through him to succeed to the property of the ancestor. The first-born in the patriarchal ages had among the Jews a superiority over his brethren, but the 'insolent prerogative of primogeniture,' as Gibbon denominates it, was especially an institution developed under feudalism. Before the Norman conquest the descent of lands in England was to all the sons alike, but latterly the right of succession by primogeniture came to prevail everywhere, except in Kent, where the ancient gavelkind tenure still remained. The right of primogeniture is entirely abolished in France and Belgium, but it prevails in some degree in most other countries of Europe. The rule operates only in cases of intestacy, and is as follows:—When a person dies intestate, leaving real estate, his eldest son is entitled by law to the whole. If the eldest son is dead, but has left an eldest son, the latter succeeds to the whole of the property. If the whole male line is exhausted then the daughters succeed—not in the same way, however, but jointly, except in the case of the crown, to which the eldest succeeds. In the United States no distinction of age or sex is made in the descent of estates to lineal descendants.

Primrose (*Primŭla*), a genus of beautiful low Alpine plants, natural order Primula-

ceæ. Some are among the earliest flowers in spring, as the common primrose, the oxlip, and cowslip; and several Japanese and other varieties are cultivated in gardens as ornamental plants. Their roots are perennial; the leaves almost always radical; and the flowers supported on a naked stem, and usually disposed in a sort of umbel. The varieties of the common primrose (*P. vulgāris*) which have arisen from cultivation are very numerous.

Primula'ceæ, the primrose order of plants, a natural order of monopetalous exogens, distinguished by the stamens being opposite to the lobes of the corolla, and having a superior capsule with a free central placenta. It consists of herbaceous plants, natives of temperate and cold regions. Many have flowers of much beauty, and some are very fragrant. See *Primrose*.

Prince (Latin, *princeps*), literally one who holds the first place. In modern times the title of prince (or princess) is given to all sovereigns generally, as well as to their sons and daughters and their nearest relations. In Germany there is a class of sovereigns, ranking next below the dukes, who bear the title of prince (*Fürst*) as a specific designation; members of royal families are, however, denominated *Prinzen*. On the Continent there are many ancient families not immediately connected with any reigning house who bear the title of prince.

Prince Edward Island, an island forming a province of the Dominion of Canada, in the Gulf of St. Lawrence, and separated by Northumberland Strait from New Brunswick on the east and Nova Scotia on the south; greatest length, from east to west, about 130 miles; breadth, varying from 4 to 34 miles; area, about 2134 square miles, or 1,365,760 acres, of which over 1,000,000 are under cultivation. The coast-line presents a remarkable succession of large bays and projecting headlands. The surface undulates gently, nowhere rising so high as to become mountainous, or sinking so low as to form a monotonous flat. The island is naturally divided into three peninsulas, and the whole is eminently agricultural and pastoral, the forests now being of comparatively limited extent. The soil consists generally of a light reddish loam, sometimes approaching to a strong clay, but more frequently of a light and sandy texture. The prevailing rock is a reddish sandstone, but a large part of the surface is evidently alluvial. The climate is mild; winter, though longer and colder than in England, is free from damp unwholesome chills; and summer, without being oppressively hot, is fitted to promote the growth of all the ordinary cereals. Sheep, cattle, and horses are reared in numbers; cod, mackerel, herring, oysters, and lobsters form the most productive part of the fisheries. The manufactures are chiefly confined to linen and flannels for domestic use; there are also several tanneries, and ship-building is carried on to a considerable extent. The exports consist of timber, agricultural produce, and live stock; the imports of dry goods, hardware, cordage, iron, &c. A railway runs from one end of the island to the other. The capital is Charlottetown. The public affairs of the island are administered by a lieutenant-governor nominated by the crown, who appoints an executive council of nine members. There is also a legislative council of thirteen and a house of assembly of thirty members, both chosen by the people. There is an excellent educational system, the elementary schools being free. The island is supposed to have been discovered by Cabot. It was first colonized by France, captured by Britain in 1745, restored and recaptured, and finally in 1873 was admitted to the Dominion of Canada. Pop. 109,078.

Prince of Wales, the title of the heir-apparent of the British throne, first conferred by Edward I. on his son (afterwards Edward II.) at the time of his conquest of the Principality of Wales. Edward III. was never Prince of Wales, but the title has been conferred on all the male heirs-apparent to the English (and afterwards the British) throne from Edward the Black Prince, son of Edward III. The heir-apparent is made Prince of Wales and Earl of Chester by special creation and investiture, or by proclamation, but as the king's eldest son he is by inheritance Duke of Cornwall. As heir to the crown of Scotland the Prince of Wales bears the titles of Prince and High-steward of Scotland, Duke of Rothesay, Earl of Carrick, Baron of Renfrew, and Lord of the Isles, in virtue of an act of the Scottish parliament of 1469. The title of Earl of Dublin is also borne by the present Prince of Wales. The arms of the Prince of Wales are the royal arms, with the addition of a label of three points argent, and any other addition that may be adopted. The Prince of Wales has also a badge, consisting of a plume of three white ostrich feathers, with the motto *Ich dien* (I serve).

Prince of Wales Island. See *Penang.*

Prince Rupert's Drops, drops of glass thrown while in a state of fusion into water, and thus suddenly consolidated, taking generally a form somewhat like a tadpole. The thick end may be subjected to the smart blow of a hammer without breaking, but should the smallest part of the tail be nipped off, or the surface scratched with a diamond, the whole flies into fine dust with an almost explosive force. This phenomenon is due to the state of strain in the interior of the mass of glass, caused by the sudden consolidation of the crust which is formed while the internal mass is still liquid. This tends to contract on cooling, but is prevented by the molecular forces which attach it to the crust. This philosophical toy receives its name from being invented or brought first into notice by Prince Rupert, nephew of Charles I.

Prince's Feather. See *Amaranthaceæ.*

Prince's Metal, or PRINCE RUPERT'S METAL, a mixture of copper and zinc in imitation of gold.

Princeton, a small town of the United States, in Mercer county, New Jersey, 40 miles north-east of Philadelphia. It is the seat of the College of New Jersey, one of the first literary institutions in the country, and also of the theological seminary of the Presbyterians. Pop. 3422.

Principal, the name given to the heads of the Scottish universities, and of several colleges in the English universities.

Principal and Agent, a designation in law, applied to that branch of questions which relate to the acting of one person for another in any commercial transaction. See *Agent, Broker, Factor.*

Principato-citra and Principato-ultra, two provinces of Italy, now generally called by the new designations of *Salerno* and *Avellino* respectively.

Printing, in a general sense, is the art of stamping impressions of figures, letters, or signs, with ink, upon paper, vellum, cloth, or any similar substance; but the term is also applied to the production of photographs from negatives, where neither ink nor pressure is used. Printing may be done (1) from engraved metal plates, in which the ink is stored for transference in the sunk or incised lines of the pattern (see *Engraving*); (2) from a level surface, as polished stone, where the ink is confined to the lines by a repellent medium (see *Lithography*); or (3) from surfaces in relief, where the ink is transferred from the raised characters, which may be either on one block or on separate or movable types. The latter method is so much the more important that it gives its restricted meaning to the term *printing*, unless where otherwise qualified.

History.—The rudiments of the art of *typography* or *letterpress-printing* were undoubtedly known to the ancients so far as the taking of impressions from blocks is concerned, and this method is still practised in China. The ancient Romans made use of metal stamps, with characters engraved in relief, to mark their articles of trade and commerce; and Cicero, in his work De Natura Deorum, has a passage from which Toland imagines the moderns have taken the hint of printing. Cicero orders the types to be made of metal, and calls them *formæ literarum*, the very words used by the first printers. In Virgil's time, too, brands with letters were used for marking cattle, &c., with the owner's name.

Block-printing in Europe, from single pieces of wood, can be traced back as far as the 13th century. In these blocks the lines to be printed were in relief as in modern wood-engraving, and each leaf of the book was printed from a single block. The leaves were usually printed only on one side of the paper, the blank sides being afterwards pasted together so as to give the volume the ordinary book appearance. By the middle of the 15th century block-book makers was a distinct craft in Germany and the Netherlands. Among the earliest species of German origin is an Apocalypsis, containing forty-eight illustrations on as many leaves; and among those of Netherlandish origin, the Biblia Pauperum of forty leaves, both works of the early 15th century.

It is a matter of much dispute to whom is due the merit of adopting movable types. The invention has long been popularly credited to Johan Gutenberg, but critical examination of early Dutch and German specimens and historical evidence would seem to point to Laurens Janszoon Coster of Haarlem as the first inventor. (See *Coster, Gutenberg.*) The date of the Haarlem invention is variously placed between 1420 and 1430. Coster's types were first of wood, then of lead, and lastly of tin; the first book printed from movable types being probably one entitled Speculum Nostræ Salutis. Gutenberg in 1449 connected himself with a rich citizen in Mainz, named Johann Fust or Faust, who advanced the capital necessary to pro-

secute the business of printing. Soon after (probably in 1453) Peter Schöffer, who afterwards became Fust's son-in-law, was taken into copartnership, and to him belongs the merit of inventing matrices for casting types, each individual type having hitherto been cut in wood or metal. The oldest work of any considerable size printed in Mainz with cast letters, by Gutenberg, Fust, and Schöffer, finished about 1455, is the Latin Bible, which is called the Forty-two-lined Bible, because in every full column it has forty-two lines; or the Mazarin Bible, from a copy having been discovered in the library of Cardinal Mazarin in Paris. Fust having separated from Gutenberg in 1456, and obtained the printing-press for his own use, undertook, in connection with Peter Schöffer, greater typographical works, in which the art was carried to higher perfection. Fust was particularly engaged in the printing of the Latin and German Bible, the first copies of which, bearing date, were printed in 1462. Fust is said to have died of the plague in 1466 at Paris, upon which Peter Schöffer continued the printing business alone at Mainz. After the separation of Gutenberg and Fust the former had found means to procure a new printing-press, and had printed many works, of which the most remarkable is the Astrological and Medical Calendar (in folio, 1457). In 1462 the city of Mainz was taken and sacked by Adolphus, count of Nassau, and this circumstance is said to have so deranged the establishment of Fust and Schöffer that many of their workmen were obliged to seek employment elsewhere. The truth seems to be that the inventor of the new art was Coster; that Gutenberg and Schöffer made important improvements on it, and aided by Fust widely spread the results of the new art. From this period printing made rapid progress throughout Europe. In 1465 we find works printed at Naples; and in 1467 Sweynheim and Pannartz, two of the most celebrated and extensive old printers, established themselves at Rome. In 1469 we find printing at Venice and Milan; in 1470 at Paris, Nuremberg, and Verona; and by 1472 the art had become known in all the important cities of the Continent. In 1490 it had reached Constantinople, and by the middle of next century had extended to Russia and America.

At the invention of printing the character of type employed was the old Gothic or German. The *Roman* type was first introduced by Sweynheim and Pannartz at Rome in 1467, and the *Italic* by Aldus Manutius about 1500. Schöffer, in his edition of Cicero's De Officiis, produces for the first time some Greek characters, rudely executed; but the earliest complete Greek work was a grammar of that language printed at Milan in 1476. The Pentateuch, which appeared in 1482, was the first work printed in the Hebrew character, and the earliest known Polyglot Bible—Hebrew, Arabic, Chaldaic, Greek, Latin—issued from the press of Genoa in 1516. Several printers' names have become famous not only for the beauty of their types, but also for the general excellence of their productions. Among these may be noted: The Aldi of Venice (1490–1597), Baden of Paris (1495–1535), Estiennes or Stephens of Paris (1502–98), Plantin of Antwerp (1514–89), Wechel of Paris and Frankfort (1530–72), Elzevir of Leyden and Amsterdam (1580–1680), and Bodoni of Parma (1768–1813).

The art of printing was first introduced into England by William Caxton, who established a press in Westminster Abbey in 1476. (See *Caxton*.) In the midst of a busy mercantile life, while resident in the Netherlands, he began about 1468 to translate Le Recueil des Histoires de Troye of Raoulle le Fevre. This work was finished in 1471, and Caxton set about learning the new art of printing, with the view of publishing his book. The Recueil, the first English printed book, appeared in 1474, printed either at Bruges or Cologne. In 1475 The Game and Playe of the Chesse, the second English book printed, appeared at Bruges, and in 1476 he began to practise the new art at Westminster. The first book printed in England, The Dictes and Sayings of the Philosophers, was printed in November 1477. Between that date and 1491 Caxton printed upwards of seventy volumes, including the works of Lydgate, Gower, Chaucer, Malory, &c. Upwards of twenty-two of these were translated by himself from French, Dutch, or Latin originals. The whole amounted to more than 18,000 pages, nearly all of folio size, some of the books having passed through two editions, and a few through three. Caxton distinguished the books of his printing by a particular device, consisting of the initial letters of his name, with a cipher between. His first performances were very rude, the characters resembling those of English manuscripts before the Conquest. Most of his letters were joined together;

the leaves were rarely numbered, the pages never. At the beginning of the chapters he only printed, as the custom then was, a small letter, to intimate what the initial or capital letter should be, leaving that to be made by the illuminator, who wrote it with a pen, with red, blue, or green ink.

Caxton's two most distinguished successors were Wynkin de Worde and Richard Pynson. The former, a native of the Dukedom of Lorraine, served under Caxton, and after the death of his master successfully practised the art of printing on his own account. The books which he printed are very numerous, and display a rapid improvement in the typographic art. He died in 1534. Pynson was a native of Normandy, and it is supposed that he also served under Caxton. The works which he printed are neither so numerous nor so beautiful as those of Wynkin de Worde. He was the first printer, however, who introduced the Roman letter into England. To Wynkin de Worde and Pynson succeed a long list of ancient typographers, into which we cannot enter here.

The first Scottish printers of whom we have any authentic account were Walter Chapman, a merchant in Edinburgh, and Andrew Millar, who, in consequence of a patent from James IV., established a press at Edinburgh in 1507. In 1536 Thomas Davidson printed, 'in the Fryere's Wynde,' Edinburgh, the Chronicles of Scotland, by Boethius, and in 1540 the works of Sir David Lindsay. Robert Lepreyik printed extensively both at Edinburgh and St. Andrews. Thomas Vautrollier was another old Scottish printer, who brought out, in 1585, Calvin's Institutes; in 1589, Tussor's Points of Good Husbandry; and in 1597 the Demonologie of King James VI. Edward Raban, a native of Gloucestershire or Worcestershire, introduced the art into Aberdeen about 1620–22, and continued printing there till 1649. In 1638 George Anderson, by special invitation of the magistrates, set up the first printing-press in Glasgow. In later days Scotland highly distinguished itself by the extent and beauty of its typographical productions. Ruddiman, who flourished at Edinburgh during the first half of the 18th century, was one of the most learned printers which any country has produced. The art has continued to flourish in the Scottish capital, and printing is now one of its chief industries. In Urie, in Robert and Andrew Foulis, in the Duncans, and others, Glasgow has produced printers whose works are alike celebrated for their elegance and accuracy. In 1551 the Common Prayer was printed in Dublin by Humphrey Powel, 4to, black letter, and this is the earliest recorded production of the Irish press; but until as far down as 1700 very few books were printed in Ireland. Alderman George Faulkner, who lived in the last century, may be considered as the father of Irish typography. Printing was introduced in the New England States of America in 1639, the first known print being the Freeman's Oath; in 1640 what is known as the Bay Psalm-book was printed in Cambridge, Mass.

Processes.—The various letters and marks used in printing are cast on types or rectangular pieces of metal, having the sign in relief on the upper end. These types, with the low pieces required to fill up spaces, are placed in cells or boxes in a shallow tray or case in such way that any letter can be readily found. The cases are mounted on a stand or frame, so that they may lie before the person who is to select and arrange the types, technically styled a *compositor*. The Roman types used are of three kinds: an alphabet of large capitals (A B C &c.), one of small capitals (A B C &c.), and one of small letters (a b c &c.), called *lower-case* by the compositor. Of italic characters only large capitals and lower-case are used. Besides these there are many varieties of letter, such as Old English, and imitations of manuscript letters, the mention of which could only be serviceable to the practical printer. Types are of various sizes, the following being those in use among British printers for book work:—English, Pica, Small Pica, Long Primer, Bourgeois, Brevier, Minion, Nonpariel, Pearl, Diamond. English has 5½ lines and Diamond 17 lines in an inch.

Composing.—The main part of the work of a compositor consists in picking up types from their respective boxes, as required to give the words in the author's manuscript that has been supplied to him. The types are lifted by the right hand and placed in a composing stick held in the left. The composing stick is a sort of box wanting one side, and having one end movable to enable it to be adjusted to any required length of line. When the words in the stick have increased till they nearly fill the space between the ends they are 'spaced out,' that is, the blanks between the words are so increased or diminished as to make them

exactly do so. Line is in this way added to line till the stick is full, when it is emptied on to a flat board with edges, called a *galley*. Subsequently the column of types so produced is divided into portions of definite length, these are furnished with head-lines and folios, and become pages.

The matter so set up is now proofed, that is, an impression is printed from it, and this goes into the hands of the printer's reader. The reader compares the proof with the author's manuscript, marks all deviations, and corrects the compositor's errors. When these have been put right a fresh proof is taken and is sent to the author for his inspection. When the pages of a book are finally passed by the author as correct, they may be arranged either for casting (done by stereotype or by electrotype process) or for going to press to be printed from. If the former, they are fixed, probably singly, in a rectangular frame of iron, or *chase* as it is called, by means of wedges, and sent to the foundry. If the latter, so many of them as are required to cover one side of the sheet of paper to be printed on are fixed in a correspondingly larger frame and sent to the printing press or machine. The pages thus arranged and fixed in the chase is called a *forme*. They are placed in such order that when the impression is taken off, and the sheet folded, the pages will follow each other in proper order. A notion of this arrangement can most readily be got by opening up and examining an eight-page newspaper.

When there are more sheets than one in a work it is advisable to have these readily distinguishable from each other. To secure this, letters (called *signatures*) are placed at the bottom of the first page of each sheet, A for the first sheet, B for the second, C for the third, and so on through the alphabet. Thus, by merely looking at the signature the binder of the book can be sure that the sheets follow in proper sequence.

When the required number of copies have been printed from a forme of movable type, or when casts have been taken from a page, the chase is carried back to the composing room, and the compositor undoes the work that was formerly done, by *distributing* all the types, that is putting them back into their respective cells in the case. They are then ready for further combinations as required.

Composing Machines.—Several attempts have been made to expedite the work of the compositor by calling in the aid of machinery. A large portion of the compositor's work consists in correcting the reader's and the author's proofs, in arranging the types in pages, in imposing these pages in formes, and in dressing the formes for press. These processes are so varied and intricate as to be beyond the range of machinery. In the three operations that do come within this range—namely, the process of 'composing,' of spacing or 'justifying' the line, and of afterwards 'distributing' the types—so much of *mind* is required, that no machine, however ingenious, can ever be a substitute. For composing newspapers, however, where the work is plain and speed is of the first consequence, composing machines of different sorts have proved themselves efficient aids, and are coming into use to an extent that a few years ago was considered very unlikely.

The main features of the larger number of those contrivances are identical, and can be very readily understood. In their working the types are not lifted as by the fingers of the compositor, but are dropped. Horizontal or vertical channels, representing the boxes of the ordinary case, contain supplies of particular types set up in rows. Each of these channels is provided with an apparatus by which, on a simple touch of the finger of the operator, a type is liberated from the end of the row, when it descends through a perpendicular or sloping channel to a common outlet, and drops into position in a holder equivalent to the compositor's 'stick.' The row thus set up is subsequently divided into lines and justified in the usual manner. Of this class of machines Hattersley's, Fraser's, and Castenbien's have been in use for several years. The gain of time is considerable in merely passing the finger from key to key, as in playing a pianoforte, compared with the travel of the hand from box to box of the case, picking up types, and putting them in correct position in the stick. The gain, however, is neutralized to some extent by the necessity of pre-arranging the types in rows for the machine, an operation unknown in hand-setting. Special machines have been contrived to facilitate this operation.

The Thorne is a more recent machine than those mentioned. It not only sets up type somewhat in the manner above indicated, but acts as a distributor of them as well, filling up its own type channels from 'dead' matter (or types which have been printed

from), and so avoiding the separate distribution and the pre-arrangement into columns of letters.

A Swedish engineer (Lagerman) has produced a clever machine called a *Typotheter*, which proceeds on different lines. The ordinary type cases, placed on the ordinary frame, are used, and the mechanical work of the compositor is reduced to lifting types to form the words (with both hands if he choose) and throwing them pell-mell into a wide-mouthed funnel placed between him and the frame, down which they slide and take position in line. The machine completes the operation and corrects irregularities. Should a type fall bottom upwards a pair of nippers automatically grip it and turn up its face; should it fall face upwards but reversed, it will in like manner be turned round by another set of nippers. As an adjunct to this machine the same inventor has produced an ingenious contrivance for spacing or justifying the lines. This is the first attempt that has been made to accomplish this very irregular process, yet it seems entirely successful.

The most recent, as it is the most ingenious contrivance, is not only a composing but a casting machine. It is called the Linotype, and is the invention of Ottmar Mergenthaler. In its main features the Linotype is wholly unlike any previous machine. No types are used: metal matrices similar to those employed by typefounders take their place. The few of these matrices used are stored in vertical channels as types are in other machines, and they are similarly brought together into words and lines on the manipulation of keys by the compositor. When a line of matrices is composed it is removed to another part of the machine, where it is automatically spaced out, then molten metal is injected into it, a 'line-o'-type' cast in one piece is produced; this line, dressed by cutters to correct thickness and height, takes its place in a column, while the matrices themselves go back along rails, and drop off into their respective channels as they are reached. When it is remembered that after the compositor has set up the line of matrices, checked it as correct, and turned a switch, the whole of the subsequent operations indicated above are purely automatic, some idea may be formed of the amount of ingenuity expended on this piece of mechanism. It is now in use in newspaper offices in America, where it was devised, and is being introduced into Britain.

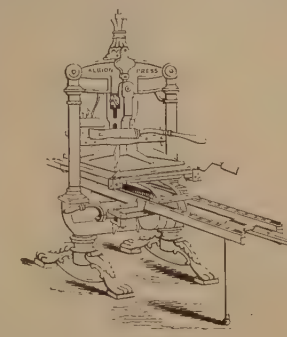
Printing.—When the forme of types has been prepared for press by the compositor it is passed over to the pressmen, who form a distinct craft. The act of printing has two operations. First there is the application of ink to the face of the types, and then the pressing of a sheet of paper on the types with such weight as to cause the ink to adhere to it. The ink used is a thick viscid fluid made of boiled linseed-oil and lampblack. It is applied to the type by means of a roller covered with an elastic compound of melted glue and treacle. When the printing is being done on hand-press the roller is carried on a light frame having handles, by which it is gripped by the hands of the pressman or printer, who in working passes the roller several times over an inked table, and then backwards and forwards over the forme. When the printing is done on machine, two or more rollers are placed in suitable bearings, and generally the forme is made to travel under them and receive ink in passing. In hand-printing the paper is placed and the pressure given by a second workman. In machine-work the sheet may be placed by an assistant, or taken in by the machine itself, or otherwise supplied by a continuous web from a reel.

These operations, purely mechanical, have, however, to be preceded by a stage of preparation called *making-ready* which calls for more or less skill and taste from the workman. His craft in plain work is to produce printed sheets, the letters or reading on which shall be sharp yet solid, with the colour or depth of black uniform all over the sheet, and each sheet uniform with the others which are to form the book. This is attained partly by properly regulating the supply of ink, but mainly by getting uniformity of pressure, as any portion of a sheet more firmly impressed than another will bring off more colour. When there are illustrations in the forme, the printer's craft is the reverse of this, for he seeks to give artistic effect to the pictures by all shades of colour, from deep black in the shadows to the lightest tints in the skies. These effects are got entirely by variations in pressure, the dark parts being heavily pressed, while the paper barely touches the inked surface in the light tints.

Mechanism of Printing.—The mechanism of printing, at first of a very simple kind, has latterly attained to great perfection and efficiency. Three methods are followed for obtaining the impression which produces the

printed sheet. The first and simplest is by the advance toward each other of two flat surfaces, one (the bed) carrying the type-forme the other (the platen) carrying the blank sheet to be printed. The second is by the rotation of a cylinder above a type-table travelling backwards and forwards, the table being in contact with the cylinder in advancing and free in returning. The third and most recently adopted method is the contact of two cylinders revolving continuously in the same direction, one carrying the type-surface and the other bringing against it a continuous web of paper, which it afterwards cuts into sheets. Presses or machines of the first class are called *platen*, the second *cylinder*, and the third *rotary*.

The press used by Gutenberg was of a very rude description, the ink being applied by means of leather-covered balls stuffed with soft material, and having suitable handles, and the pressure being obtained by a screw which brought down a flat block or platen. The first improvement on this device seems to have been the construction of guides, enabling the type-forme to be run under the impressing surface and withdrawn with facility. Other necessities soon after arose, chiefly that of obtaining a rapid return of the platen from the position at which it gave the pressure without the screw requiring to be turned back; but it was not till the year 1620 that this was met by the invention of Willem Janszoon Blaeu, a native of Amsterdam. Charles Mahon, the third earl of Stanhope, was the author of the next great improvement in printing-presses, about 1800. He devised a combination of levers, which he applied to the old screw-press. These levers brought down the platen with greatly increased rapidity, and what was of still greater importance, converted at the proper moment that motion into direct pressure. The pressure was under control and capable of easy adjustment. The press was of iron, not of wood as was the case with all previously constructed presses, and it exhibited a number of contrivances of the most ingenious character for facilitating the work of the pressman. In 1813 John Ruthven, a printer of Edinburgh, patented a press on the lever principle, with several decided improvements. The Columbian Press, invented in 1814 by G. Clymer, Philadelphia, and the Albion Press, are the latest contrivances, and they are still in use to a limited extent. Even in its best form the hand-press is laborious to work and slow in operation, two workmen not being able to throw off more than 250 impressions in an hour. It therefore became imperative, especially for newspapers, to devise some more



Albion Press.

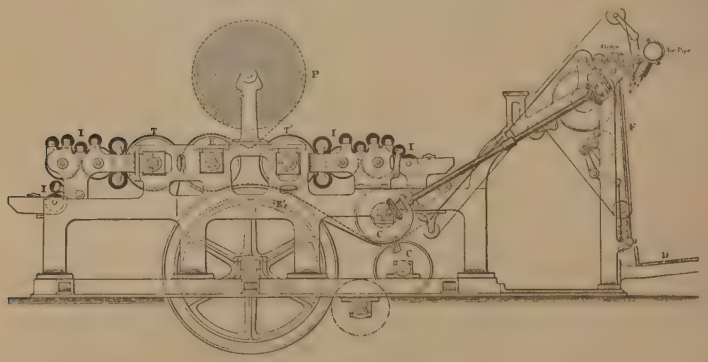
expeditious and easy method of taking impressions from types.

So early as the year 1790 Mr. Nicholson took out letters-patent for printing by machinery. His printing-machine never became available in practice, yet he deserves the credit of being the first who suggested the application of cylinders and inking-rollers. About ten years later König, a printer in Saxony, turned his attention to the improvement of the printing-press, with a view chiefly to accelerate its operation. Being unsuccessful in gaining assistance in his native country to bring his scheme into operation, he came to London in 1806. There he was received with equal coldness, but ultimately, with the assistance of Mr. Bensley, he constructed a machine on the platen or hand-press principle. Afterwards he adopted Nicholson's cylinder principle, and succeeded in producing a machine which so satisfied Mr. Walter, proprietor of the Times newspaper, that an agreement was entered into to erect two to print that journal. On the 28th of November, 1814, the reader of the Times was informed that he held in his hand a paper printed by machinery moved by the power of steam, and which had been produced at the rate of 1800 impressions per hour. This is commonly supposed to be the first specimen of printing executed by steam machinery; but König's platen machine was set to work in April

1811, and 3000 sheets of signature H of the Annual Register for 1810 were printed by it. That was undoubtedly the first work printed by machinery.

A further improvement was made in May 1848, by Applegarth. His machine, which printed 10,000 impressions per hour, had a vertical cylinder 65 inches broad, on which the type was fixed, surrounded by eight other vertical cylinders, each about 13 inches diameter and covered with cloth, round which the paper was led by tapes, each paper or impression cylinder having a feeding apparatus and two boys tending. The type used was the ordinary kind, and the forme was placed on a portion of the large cylinder. The surface of the type formed a portion of a polygon, and the regularity of the impression was obtained by pasting slips of paper on the impression cylinders.

Few machines, however, of this construction were made, a formidable rival having appeared, devised by Messrs. Hoe & Co. of New York, which was introduced into many



Open-delivery Web Machine of Hoe & Co.

newspaper offices in Great Britain. It was constructed with from two to ten impression cylinders, each of them printing from a set of types placed on a horizontal central cylinder of about 6½ feet in diameter, a portion of which was also used as a cylindrical inktable, each of the encircling cylinders having its own inking rollers and separate feeder. A machine of this construction, having ten impression cylinders, threw off at the rate of 18,000 impressions an hour.

Repeated attempts were made by inventors to construct a machine which would print from the continuous roll or web in which paper is supplied by the paper-making machine. Experiments were conducted successively by Nicholson, Stanhope, Sir Rowland Hill, Applegarth, and others, but the difficulties for the time proved insurmountable. These, however, have at length been overcome, and the result is the construction of a class of machines which possess the merit of being at once simpler, more expeditious, and more economical in requiring less attendance than any previous contrivance.

The first machine on the web principle that established itself in the printing-office was the 'Bullock,' an American contrivance. It was, however, speedily eclipsed by the 'Walter Press,' invented and constructed on the premises of the London Times. Since then several other rotary machines have been invented and brought into extensive use. Of these may be named the 'Victory,' the 'Prestonian,' and machines by Marinoni of Paris, and Messrs. Hoe & Co. of New York. The 'open-delivery' machine (that is, unprovided with an apparatus for folding the papers) of the latter firm may be taken as a type of rotary machines, and is shown in the figure. The roll of paper P is placed immediately above the type cylinders, which are fitted to a horizontal frame. The web is printed on one side by the forme on the cylinder T, then on the other on cylinder T', and thence passes between two cutting cylinders C C which are of the same dia-

meter as the printing cylinders. The sheets thus severed then travel upward over a drum, and when any desired number of sheets are gathered they are directed by a switch down the flyers F and deposited on the taking-off board D. E is the impression cylinder for the printing cylinder T, and E′ for T′. The cylinder E′ is made of large diameter in order that the blanket with which it is covered may absorb the surplus ink of the first-printed side of the web. The inking apparatus consists of two drums parallel to each other, each provided with the necessary inking-rollers I I. The producing power of this machine is from 12,000 to 15,000 perfect eight-page papers per hour.

The machines hitherto described have been of the cylinder class and of the outcome of that class—the rotary. The *platen* or flat-surface printing-machine was contrived soon after the introduction of the cylinder, and had for its aim the production of work equal in quality to that produced by the hand-press, and at a greater speed. It is constructed upon the same principle as the hand-press so far as the mode of taking the impression is concerned, but is distinguished from that press in that it automatically inks the forme, runs in the carriage, brings down the platen and returns it, then runs out the carriage, the tympan being lifted by attendants, who remove the printed sheet, replace it with another, turn down the tympan, and leave the machine to go through its motions over again. The great improvements recently made on cylinder machines, especially of the 'French' class, having made them capable of producing book work of the finest quality, the use of the platen is now confined to special sorts of work.

Prior, a title somewhat less dignified than that of abbot, formerly given to the head of a small monastery, designated a *priory*. Similarly the term *prioress* was applied to the head of a convent of females. See *Abbey*.

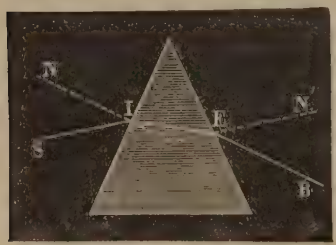
Prior, MATTHEW, an English poet, the son of a joiner, born in 1644, and educated at Westminster School. He early found a patron in the Earl of Dorset, through whose good offices he was enabled to enter, in 1682, St. John's College, Cambridge, where he graduated as B.A. in 1686, and was shortly after chosen fellow. At college he contracted an intimacy with Charles Montagu, afterwards Earl of Halifax, in concert with whom, in 1687, he composed the Country Mouse and City Mouse—a parody on Dryden's Hind and Panther. This work brought him into fame, and in 1690 he was appointed secretary to the English embassy at the Hague. In 1697 he was nominated secretary to the plenipotentiaries who concluded the Peace of Ryswick, and on his return was made secretary to the Lord-lieutenant of Ireland. In 1701 he entered parliament as a Whig, but soon after changed his politics and joined the Tory party. He was in consequence excluded from office during the régime of Marlborough and Godolphin, and he employed himself in writing and publishing another volume of poems. In 1711, when the Tories again obtained the ascendency, he was employed in secretly negotiating at Paris the terms of the Treaty of Utrecht, and he remained in France until 1714, at first as a secret agent, afterwards as ambassador. On the accession of George I., when the Whigs were once more in power, Prior was recalled and examined before the privy-council in respect to his share in negotiating the Treaty of Utrecht, and was kept in custody on a charge of high treason for two years, although ultimately discharged without trial. During his imprisonment he wrote Alma, or the Progress of the Mind, which, together with his most ambitious work, Solomon, was published in 1718. He died in 1721 and was buried in Westminster Abbey. Prior was endowed with much wit and power of satire; and many of his lighter pieces are charming, but his serious performances fail in moving either the feelings or the fancy.

Priscia'nus, usually known as PRISCIAN, a celebrated Roman grammarian, who lived in the latter half of the 5th century of our era, and of whom little more is known than that he was born at Cæsarea, taught grammar at Constantinople in the time of Justinian, and wrote the Institutiones Grammaticæ, an exposition of Latin grammar. His work, successively abridged by several writers, formed the basis of instruction in Latin up to the 15th century, and there exist at present about one thousand MSS. of it, none dating before the 9th century. It contains numerous quotations from Latin authors now lost.

Priscil'lian, the founder of a sect in Spain, known as Priscillianists, in the middle of the 4th century, their doctrines being a mixture of Gnosticism and Manichæism. Priscillian was himself a wealthy and accomplished man, of very temperate and

strenuous habits. His followers did not leave the Catholic church, and he was actually at one time made a bishop himself. He was ultimately executed at Treves in 385, after a prolonged struggle with the orthodox clergy. The most distinctive part of his creed was the belief in an evil spirit as the supreme power. His sect lasted until about 600 A.D.

Prism, in geometry, a solid figure which might be generated by the motion of a line kept parallel to itself, one extremity of it being carried round a rectilinear figure. A 'right prism' is one in which the faces are



Light passing through Prism.

at right angles to the ends. In optics a prism is a transparent body having two plane faces not parallel to one another, and most commonly it is made of glass, and triangular in section, the section forming either a right-angled, equilateral, or isosceles triangle. The two latter varieties are most familiar. If a ray of light, SI, enter such a prism by one of the two principal faces, it is bent in passing through so as to take the direction by IEB. The angle which the ray in the prism makes with the normal, NI, is always smaller than the angle of incidence, NIS, and the angle which it makes with the normal, EN′, is smaller than the angle of emergence, N′EB, the ray being always bent towards the base of the prism. Not only is the ray thus bent, but it is also decomposed, and by suitable arrangements could be exhibited as made up of what are usually known as the seven primary colours: violet, indigo, blue, green, yellow, orange, and red. See *Colour*, *Light*, *Optics*, *Spectrum*.

Prison, a house in which a person is confined and thereby deprived of his personal liberty; especially a building for the confinement or safe custody of criminals, debtors, or others. Imprisonment is now one of the recognized methods of judicially punishing certain crimes; but formerly it was employed in nearly every country in Europe for purposes of injustice and oppression. Men were hidden in dark dungeons, where in a short time they perished, through the inefficiency of the law to protect those who were offensive to the powerful; and even in Great Britain, where the laws have always condemned the incarceration of the innocent, the prison was, by the connivance of the authorities, made subservient to gross injustice and cruelty. To the 18th century belongs the honour of initiating the proper regulation of imprisonment. In Britain parliamentary inquiries brought out strange revelations as to the horrors of the debtors' prisons; but public interest in the subject was only effectually aroused by the extraordinary exertions of the celebrated John Howard, who in 1773 began, without any official standing, to make inspections of the chief English prisons. He found these places not only insanitary and ill-ventilated, but filthy, poisonous, and in nearly every case overcrowded. Disease was rampant, and no measures were taken to prevent its spread; many of the prisons were utterly unfit for human creatures to live in; and, to crown all, such intercourse was allowed between the prisoners as ensured the reduction of all to the level of the most corrupt and criminal. Howard's revelations caused such a feeling throughout the country that prison reformation could no longer be delayed. The result was that parliament entrusted a committee of three (of whom Howard was one) with the duty of framing a suitable scheme for the future management of the prisons. Their recommendations were embodied in the Act 19, Geo. III. c. 74 (1779), which sets forth distinctly the principles that were to govern future prison discipline in Britain. The chief features emphasized are—solitary confinement, cleanliness, medical help, regular work, and the enforcement of order—the same principles, indeed, which are now adopted by every civilized state in the world. Up almost to this time many criminals had been sent as convicts to America; but this being no longer possible, the new scheme was intended to provide accommodation for such at home. Australia, however, now presented itself as a new field for transportation, and the legislature hailed with joy this new receptacle for criminals. The newborn zeal of the public died out with the

absence of any need for change, and the whole scheme dropped for eleven years, to be revived again by the earnest enthusiasm of a single individual. In 1791 Bentham published a work, in which he constructed (on paper) a model prison, which he called the Panopticon. Next year he proposed himself to construct the building in reality. His ideal prison was not unlike Howard's; but Bentham trusted greatly to publicity and free communication between criminals and the public for the protection of the inmates from oppression. In 1794 the government adopted his scheme, but the construction of the prison was put off till 1810, when Sir Samuel Romilly moved parliament to take up the matter once more. This time it was pushed to a successful issue; and in 1811 was erected the famous penitentiary of Millbank, virtually on Howard's plans, and destined to be the precursor of the modern prison. This was only the beginning of reform, and the credit of carrying it on is largely due to the Prison Discipline Society, and to Mr. Buxton and Mrs. Fry, its leading members. The latter began her work at Newgate in 1813, and found that prison in a state as bad as can be imagined. Among the prisoners themselves she effected a reformation, perhaps only temporary; but among the public her efforts inaugurated a desire for improvement which resulted in the abolition of all such scandals. In 1824 and 1825 the legislature passed important acts for the regulation of prisons, containing provisions for moral and sanitary care of prisoners, separation of the sexes, &c. The use of irons was partially forbidden, and separate cells for each prisoner recommended. These laws, though not carried out to the letter at first, were very helpful to future reformers. In 1831 a committee of the House of Commons reported in favour of separate cells in all cases, and this suggestion was adopted. The gradual work of modernizing prisons then went on until the cessation of transportation to New South Wales in 1840 and the general defects of this system rendered it necessary to look out for new ways of disposing of the criminal population. The chief features of the new scheme now brought into operation consisted of the following: (1) Separate confinement in a penitentiary for a short period; (2) hard prison labour in some public work; and (3) transportation with ticket-of-leave. For the first of these forms of punishment the existing prisons were used; for the second, which really came in place of the former system of wholesale transportation, public work was found at Portland, Dartmoor, and Portsmouth. The third was not successful. The colonies refused to receive the ticket-of-leave men, and these had ultimately to be liberated at home. At present the system of imprisonment in Britain stands thus: When the convict is sentenced for a period of two years or less, the punishment is technically termed imprisonment. The criminal passes the time in a local prison, where he lives in solitary confinement and works at the treadwheel for a month; if his conduct is good he receives marks which entitle him to improved conditions as the close of his term approaches. Penal servitude is the title applied to terms of imprisonment which exceed two years. It is passed in a convict prison, and is divided into three periods. The first lasts nine months, is one of solitary confinement, and during it the convict is set to work at some industry. The second period is also distinguished by cellular isolation, but the convict works along with others under the supervision of warders at one of the great convict prisons such as Portland or Dartmoor, where their labour results to the public advantage. The final period is that of release on ticket-of-leave, during which the convict is obliged to report himself at intervals to the police, and is generally under strict supervision. See also *Punishment*.

Prisoners of War are persons captured from the enemy in time of war. In ancient times prisoners of war became the slaves of their captors, and even yet it is a recognized principle among nations that all the inhabitants of a vanquished town, state, or nation become the absolute property of the victors, though it is hardly necessary to say that the principle is now no longer acted upon by civilized nations. Prisoners of war are now generally either kept until the war is over, released on parole, or exchanged for prisoners taken by the other side.

Prisrend', PRISRENDI, a town of European Turkey, in Albania, 80 miles east of Scutari. It is the residence of a pasha, and the seat of a Greek metropolitan and a Catholic bishop, and is one of the richest towns in Turkey, manufacturing large quantities of weapons, pottery, glass, &c. Pop. 39,000.

Pritzwalk (prits'välk), a town of Prussia, in the government and 66 miles north-west of Berlin. Brewing and distilling are carried on. Pop. 6089.

Privas (prē-vä), a town in Southern France, capital of the department Ardèche, about 6 miles west of the Rhone. Pop. 4217.

Privateer, a vessel of war owned and equipped by private individuals to seize or plunder the ships of an enemy. Such a vessel must be licensed by government and under a letter of marque, otherwise she is a pirate. The letters of marque were first granted in England during the reign of Henry V., in view of the war with France; and they were issued to aggrieved subjects in order that they might compensate themselves for injury done by foreigners. In the 16th century it became common to grant commissions to privateers. England, Holland, and Spain, as the three principal naval powers, used this effective weapon freely; and France also sent out privateers in every war in which she was engaged. A neutral is not forbidden by the law of nations to accept a commission for privateering; but he may be, and generally is, by treaty. Since 1870 British subjects have been forbidden to accept such commissions. By the Declaration of Paris, 1856, the great powers of Europe mutually agreed to abandon the right to arm privateers in case of war; but several nations, chief of them being the United States and Spain, have not agreed to this, and it is doubtful whether it will be always strictly acted upon even by the parties to the declaration. The German volunteer fleet of 1870 can not be very clearly distinguished from a collection of privateers. The practice of privateering, while useful to maritime countries, and necessary at one period to England, is very harassing to trade, and gives endless opportunities for private plunder. It was probably in deprecation of irresponsible warfare of any kind that the powers agreed to abandon privateering in 1856.

Privet (*Ligustrum*), a genus of plants of the order Oleaceæ. The common privet (*L. vulgāre*) is a native of Europe, growing 8 or 10 feet high; the leaves are elliptico-lanceolate, entire, and smooth; the flowers slightly odorous, white at first but soon changing to a reddish-brown; and the berries dark purple, approaching black. This species is much used in gardens for ornamental hedges. There are numerous other species, many of them being natives of China and other Asiatic countries.

Privilege (Latin, *privilegium*), a particular exemption from the general rules of law. This exemption may be either *real* or *personal:* real, when it attaches to any place; personal, when it attaches to persons, as ambassadors, members of parliament, clergymen, lawyers, and others. Real privilege is now of little importance; personal privilege, however, is guaranteed in certain cases to many classes of individuals. For instance, suitors and counsel are exempt from arrest while in court; and members of parliament while in the House of Commons.

Privileged Communication. See *Confidential Communication.*

Privy-chamber, GENTLEMEN OF THE, officers of the royal household of England, instituted by Henry VII. Their duties are to attend the sovereign; but their appointment is now merely a mark of honour, neither service nor salary being attached to their posts.

Privy-council, the council of state of the British sovereign, convened to concert matters for the public service, and for the honour and safety of the realm. The English privy-council may be said to have existed from times of great antiquity; but the *concilium ordinarium*, established by Edward I., was the parent of the modern institution. It consisted of the chief ministers, judges, and officers of state, and grew in power and influence rapidly, though repeatedly checked by jealous parliaments. Since the time of the Long Parliament the power of the council has been much reduced, and the rise of the cabinet has effectually blotted out all the more important functions of the earlier body. The privy-council of Scotland was absorbed in that of England at the Union; but Ireland has a special privy-council still. As it exists at present, the number of members of the privy-council is indefinite; they are nominated by the sovereign at pleasure, and no patent or grant is necessary, but they must be natural-born subjects. The list of privy-councillors (some 200 in number) now embraces, besides the members of the royal family and the members of the cabinet, the archbishops and the Bishop of London, the great officers of state, the lord-chancellor and chief judges, the speaker of the House of Commons, the commander-in-chief; and other persons who fill or have filled responsible offices under the crown, as well as some who may not have filled any important office. Officially at the head is the lord-president of the council, who is appointed by patent, and who manages the debates and reports results to

the sovereign. A member of the privy-council has the title of 'right honourable.' It is only on very extraordinary occasions that all the members attend the council, and it is not now usual for any member to attend unless specially summoned. The attendance of at least six members is necessary to constitute a council. Privy-councillors are by their oath bound to advise the crown without partiality, affection, or dread; to keep its counsel secret, to avoid corruption, and to assist in the execution of what is resolved upon.

While the political importance of the privy-council, once very great, has been extinguished by the growth of the system of party government, it still retains functions both administrative and judicial. The former is chiefly exercised by means of committees of the council, which have certain statutory duties apportioned to them. The Board of Trade is still nominally at least regarded as one of these committees. Another is the judicial committee of the council, a body established in 1833, and consisting of the lord-chancellor and other judges, some being Indian or colonial. Later legislation tends to assimilate this committee with the House of Lords as final judges of appeals. Barring some not important original jurisdiction, the judicial committee of the privy-council is a final court of appeal from India and the colonies, the Channel Islands, and the Isle of Man. A special committee of the council is also at the head of all educational matters in Britain. It was first appointed in 1839 for administering the grants which it had been the practice of the government to make for some time previously, with a view to meet the educational wants of the country. It includes the president and vice-president of the council, the latter of whom has the position of minister for education. Under his department the parliamentary grant is distributed, the educational code framed or altered, the inspectors of schools appointed, the borrowing of money by board schools sanctioned, &c.

Orders in council are orders issued by the sovereign, by and with the advice of the privy-council, either by virtue of the royal prerogative, and independently of any act of parliament, or by virtue of such act, authorizing the sovereign in council to modify or dispense with certain statutory provisions which it may be expedient in particular conjunctures to alter or suspend.

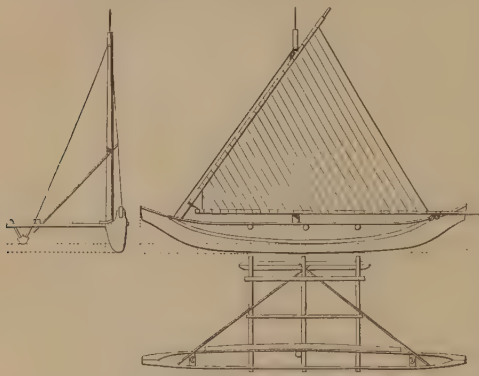
Privy-purse, Keeper of the, an officer of the royal household of Great Britain, whose function it is to take charge of the payment of the private expenses and charities of the sovereign.

Privy-seal, a seal appended by the British sovereign to such grants or documents as are afterwards to pass the great seal. Since the time of Henry VIII. the privy-seal has been the warrant of the legality of grants from the crown, and the authority for the lord-chancellor to affix the great seal; such grants are termed letters-patent. The officer who has the custody of the privy-seal is called lord privy-seal, and is the fifth great officer of state, having also generally a seat in the cabinet.

Prize, anything captured in virtue of the rights of war. Property captured on land is usually called *booty*, the term prize being more particularly used with reference to naval captures. The right of belligerents to capture the property of their enemies on the sea is universally admitted, as well as the right to prevent violation of the law of nations by neutrals, so long as the independence of other nations is not interfered with. It is accordingly settled as a principle of the law of nations that every belligerent has a right to establish tribunals of prize, and to examine and decide upon all maritime captures; and likewise that the courts of prize of the captors have exclusive jurisdiction over all matters relating to captures made under the authority of their sovereign. The sentence of a court of competent jurisdiction once pronounced is conclusive and binding on all nations. Questions of naval prize-money in England are adjudicated by the courts of admiralty. The 27 and 28 Vict. c. xxv. (1864), regulates the proceedings in the case of a naval prize. The captive ship is delivered up to the court without breaking of bulk; and if the capture is adjudged legal, is sold for the benefit of the captors, among whom the proceeds are divided according to their rank.

Proa, a peculiar kind of sailing-boat used in the Malay or Eastern Archipelago and the Pacific. It is variously constructed, but regularly has one side quite flat, on a line with the stem and stern, while the other side is curved in the usual way; and being equally sharp at stem and stern, it sails equally well in either direction without turning. Their shape and small breadth of beam would render them peculiarly liable to overset were it not for the outrigger they

carry, adjusted sometimes to one side and sometimes to both sides. The outrigger in the example here shown is a large structure supported by and formed of stout timbers.



Plan, Elevation, and End View of Proa.

The outrigger may have weights placed on it and adjusted according to circumstances. Proas carry a lugsail generally of matting.

Probabilists, a name applied to those philosophers who maintain that certainty is impossible, and that we must be satisfied with what is probable. This was the doctrine of the New Academy at Athens, particularly of Arcesilaus and Carneades.

Probability, in algebra, the mathematical investigation of chances; the ratio of the number of chances by which an event may happen, to the number by which it may both happen or fail. If an event may happen in a ways and fail in b ways, and all these ways are equally likely to occur, the probability of its happening is $\frac{a}{a + b}$, and the probability of its failing is $\frac{b}{a + b}$, 'certainty' being represented by unity. When the probability of the happening of an event is to the probability of its failing as a to b, the fact is expressed in popular language thus—the 'odds' are a to b for the event, or b to a against the event. If there are three events such that one must happen, and only one can happen, and suppose the first event can happen in a ways, the second in b ways, and the third in c ways, and that all these ways are equally likely to occur, then it is evident that the probability of the happening of the first event is $\frac{a}{a + b + c}$, and of its failing $\frac{b + c}{a + b + c}$. Example: Suppose that 3 white balls, 4 black balls, and 5 red balls are thrown promiscuously into a bag, and a person draws out one of them; the probability that this will be white is $\frac{3}{12}$ or $\frac{1}{4}$, the probability that it will be black is $\frac{4}{12}$ or $\frac{1}{3}$, the probability that it will be red is $\frac{5}{12}$. The theory of probabilities is a complicated and extensive one, and has been much utilized in actuarial science; it has also been used in calculating the chances at various games.

Probate, in law, the official proof of a will, that is the proceeding by which it is established as the last will and testament of the party whose will it professes to be. In England this is obtained in the Probate branch of the High Court of Justice. The original will is deposited in the registry of the court and a parchment copy given to the executors, with certificate of its having been proved. See next two arts.

Probate, Court of, an English tribunal established by act of parliament in 1857, to which all the powers previously exercised by the ecclesiastical courts in the granting of probates of wills and letters of administration were transferred. This court was merged in the Supreme Court by the Judicature Act of 1874, by which its jurisdiction was assigned to a Probate, Divorce, and Admiralty Division. The functions of this branch are confined entirely to deciding on the authenticity of wills and upon the proper persons to whom administration is to be committed when no will exists. The practice of the court is thrown open to the whole legal profession, and its proceedings are otherwise assimilated to the courts of common law.

Probate Duty, a tax upon the gross value of the personal property of a deceased person levied by means of a stamp upon the affidavit required of a person applying for

probate (which see). Previous to 1894 probate duty used to be charged separately on the estates of deceased persons, but since that date it is not exacted as such, the new estate duty then fixed covering all death duties.

Proboscid'ea, an order of mammals distinguished, as implied by this name, by the possession of the characteristic proboscis or trunk. Of this class the elephant alone exists; but there are several extinct animals comprised in it, such as the mammoth and the mastodon.

Probos'cis, the term applied to the longer or shorter flexible muscular organ formed by the elongated nose of several mammals. Although seen in a modified degree in the tapirs, &c., the term is more generally restricted, and applied to indicate the flexible 'trunk' of the elephant. See *Elephant*.

Proboscis Monkey, or KAHAU (*Presbytes nasālis*), a native of Borneo, distinguished particularly by its elongated nose, its shortened thumbs, and its elongated tail. The general colour is a lightish red. These monkeys are arboreal in habits, and appear to frequent the neighbourhood of streams and rivers, congregating in troops.

Probus, MARCUS AURELIUS, one of the ablest of the Roman emperors, was born at Sirmium in the year 232. At an early age Marcus attracted the notice of the Emperor Valerian, by whom, after having distinguished himself by military service, he was placed at the head of a legion; and the brilliancy of his subsequent conduct in the African, Persian, Arabian, and Germanic campaigns brought him into still more prominent notice. On the death of the Emperor Tacitus, in 276, the army hailed him as emperor, a selection immediately confirmed by the senate and people of Rome. His chief struggle during his reign was to guard the frontiers of the empire against the barbarians, a task which he carried out with great success both in Europe, Asia, and Africa. He also settled large numbers of barbarians in the frontier provinces, and admitted them to his legions; and devoted himself to the making of roads and draining of marshes. His skilful administration and public virtues did not, however, protect him from enmity; and after a short reign he was murdered in a military insurrection in 282.

Proce'dure, CIVIL, is the method of proceeding in a civil suit throughout its various stages. In England, when redress is sought by law for a civil injury, the injured party brings an *action* against the party whom he alleges has done the injury. The person who raises an action is termed the *plaintiff*, and he against whom the action is brought the *defendant;* in Scotland the terms are *pursuer* and *defender*. It is usual before the suit is commenced for the plaintiff's attorney to acquaint the defendant with the demand of his client, and state that unless complied with legal proceedings will be instituted. Should this not have the desired effect, the action is begun as a rule by issuing against the defendant a *writ of summons*, commanding him to enter *an appearance* in court, failing which an appearance will be entered for him by the plaintiff. (See *Non-appearance*.) When an appearance has been entered both parties to the suit are now said to be *in court*, and judgment may be proceeded with. The next stage is the *pleadings* or the statements in legal form of the cause of action or ground of defence brought forward by the respective sides. The next stage of procedure after the pleadings is the *issue*, which may be either on matter of law, when it is called a *demurrer*, or on matter of fact, where the fact only is disputed. A demurrer is determined by the judges after hearing argument on both sides, but an issue of fact has to be investigated before a jury, and this is denominated *trial by jury*. (See *Jury and Jury Trials*.) After the judge has summed up to the jury the *verdict* follows and then the *judgment* of the court; where there is no jury, of course, judgment is pronounced by the judge after hearing counsel.

Procellar'idæ, the petrel family of birds, of which the typical genus is *Procellaria*.

Process, in law, a term applied in its widest sense to the whole course of proceedings in a cause real or personal, civil or criminal.

Processional, a service-book of the Roman Catholic Church, for use in religious processions. Some of the processionals of ancient date are very rare, and highly valued by book-fanciers.

Procession of the Holy Ghost. See *Holy Ghost*.

Procida (pro'chi-dà; anciently, *Prochyta*), an island on the west coast of S. Italy, lying nearly midway between the island of Ischia and the coast of the province of Naples. It is about 3 miles long and 1 mile broad, flat in surface, and fertile. The principal place of the island is Procida, or Castello di Procida, which has a harbour, a castle, and a considerable trade. Pop. 14,247.

Procida, GIOVANNI DA. See *Sicilian Vespers.*

Proclamation, ROYAL, a public notice made by the sovereign of a country to his subjects, concerning any matter which he thinks fit to give notice about. It may consist of an authoritative announcement of some great event affecting the state, but is most commonly used in Britain for the summoning, prorogation, and dissolution of parliament. A royal proclamation must be issued under the great seal. By statute, royal proclamations are only binding when they do not contradict existing laws or tend to establish new ones.

Proclus, a philosopher of the Neo-Platonic school, born at Byzantium in 412; died at Athens in 485. He was educated at Alexandria and Athens and became familiar with all branches of philosophy and theology. As a teacher at Athens he was very successful. His system aimed at the widest comprehensiveness. He not only endeavoured to unite all philosophical schemes, but made it a maxim that a philosopher should embrace also all religions by becoming infused with their spirit. In his writings he professes to return to Plato, and to bring down Neo-Platonism from the misty heights to which it was raised by Plotinus. M. Cousin placed him on a level with the most distinguished philosophers of Greece, but this estimate is generally considered extravagant. His extant works include a Sketch of Astronomy, in which he gave a short view of the systems of Hipparchus, Aristarchus, and Ptolemy; The Theology of Plato, Principles of Theology, a Life of Homer, &c.

Proconsul and Proprætor, originally, in the ancient Roman system of administration, a consul or prætor whose command (or *imperium*) was prolonged for a particular purpose after his demission of office. In course of time the terms came to be applied to any one who was intrusted with some special service, and with magisterial authority for the purpose of performing it. Proconsuls and proprætors were generally men who had been consuls or prætors, but were not always so. There were four varieties of proconsul: 1. A distinguished statesman, formerly consul, appointed for a special duty. 2. An individual, who had never been consul, was sometimes created proconsul to be sent on some important mission. 3. A consul occasionally had his *imperium* prolonged, in order to complete some undertaking he had commenced. 4. A consul appointed after his term of office to the government of a province. The proconsuls under the republic had no authority within the walls of Rome, and they lost their *imperium* on entering the city. Under the empire the emperor was always invested with proconsular authority.

Proco'pius, ANDREW, a Hussite leader of the 15th century. He succeeded Ziska in 1424 as commander of the Taborites, the chief section of the Hussites, and became the dread of the troops of the Emperor Sigismund. He made himself master of a large part of Bohemia, and ravaged Moravia, Austria, and Silesia. His principal military triumphs were the battle of Aussig in 1426, and his campaigns in Silesia and Saxony in the following year. His expeditions were marked with great courage and slaughter, besides the destruction of many cities, of which Dresden was the chief. In 1431 he gained a great victory over the Elector of Brandenburg, who was in alliance with Sigismund, and in 1433 he appeared with a large following at the Council of Basel, and demanded, in the name of the Hussites, various reforms in religious matters. As the section of the Hussites led by Procopius were not satisfied with the concessions made by the council war was resumed, but Procopius was killed soon after in a battle fought at Böhmischbrod (1434).

Procopius of Cæsarea, a Greek historian, a native of Cæsarea, in Palestine, where he is supposed to have been born about 500 A.D. He first attracted the notice of Belisarius, who appointed him his secretary; and about the year 541 he was appointed by the Emperor Justinian a senator and afterwards (562) prefect of the city. He died at Constantinople about 565 A.D. His works are a History of his Own Times and a history of the edifices built or repaired by Justinian. A scandalous chronicle of the court of Justinian, entitled Anecdota, has also been attributed to him by some writers.

Procrus'tes ('the Stretcher'), a celebrated robber of ancient Greek legend, whose bed is still proverbially spoken of. The legend of him is, that if his victims were too short for the bed, he stretched them to death, while, if they were too tall, he cut off their feet or legs.

Procter, BRYAN WALLER, an English poet and prose writer, born about 1789; died in London, October 4, 1874. He was educated

at Harrow, where he was the school-fellow of Byron and Peel. His first published work was entitled Dramatic Scenes and other poems, and appeared in 1819 under the pseudonym of Barry Cornwall, which remained Procter's pseudonym in his future writings. This volume being well received, he published shortly thereafter A Sicilian Story and Marcian Colonna. In 1821 he produced a tragedy, Mirandola, which was performed with great success at Covent Garden. Procter also wrote several other books of poetry and a variety of prose works; the most interesting of these latter being a Memoir of Charles Lamb, of whom he was an intimate personal friend. Procter's poems exhibit much delicate grace and refinement, but have never attained great popularity. He was called to the bar in 1831, and for many years held the post of a commissioner in lunacy, which, however, he resigned in 1860.—His daughter, ADELAIDE ANNE, born in London in 1825, died in 1864, was a poetess of some note. Her songs and hymns show much taste and feeling, but she never attempted anything on a large scale. Her best-known volume is Legends and Lyrics, published in 1858.

Proctor (from the Latin *procurator*), a person who in the ecclesiastical and admiralty courts in England performs the duties of an attorney or solicitor. The proctors were formerly a distinct body, but any solicitor may now practise in these courts. The queen's proctor is a crown official charged with the duty of conserving the public interests in certain classes of private lawsuits. In the Universities of Oxford and Cambridge the proctors are two officers chosen from among the masters of arts, whose office is to preserve discipline.

Proctor, RICHARD ANTHONY, English astronomer, born at Chelsea in 1837, and educated at King's College, London, and Cambridge University. Having devoted himself specially to the study of astronomy, he published a number of valuable works on the subject, including Saturn and its System, Handbook of the Stars, Half Hours with the Telescope, Half Hours with the Stars, Other Worlds than Ours (a very popular work), Light Science for Leisure Hours, The Transits of Venus, The Cycloid and Cycloid Curves, several Star Atlases, The Universe of Stars, The Moon, Old and New Astronomy, &c., besides two treatises on whist. He latterly resided a good deal in the U. States, and he died there in 1888.

Proc'urator, among the ancient Romans, a provincial officer who managed the revenue of his province. In some of the small provinces, or in a part of a large province, the procurator discharged the office of a governor, and had the power of punishing capitally, as was the case with Pontius Pilate in Judæa, which was attached to the province of Syria.

Procurator-fiscal, in Scotland, an officer appointed to act as the public prosecutor in criminal cases before the sheriff, magistrates, or justices of the peace belonging to his district. He is allowed to practise privately as a lawyer also. When information of a crime committed within a procurator-fiscal's district has been laid before him, it is his business to ascertain the truth of the charge, to obtain a warrant for the apprehension of the accused, to see that the warrant is carried out, and in general to do whatever else is necessary to protect the innocent, and bring to justice the guilty. All precognitions of witnesses are taken by him before the sheriff or sheriff-substitute of the district. The procurator-fiscal has also, in conjunction with the sheriff, to discharge the duties of a coroner in making investigations with regard to persons who are suspected to have died from other than natural causes.

Pro'cyon, the genus of animals to which the racoon belongs.

Production, COST OF, a phrase used in political economy, not always in the same sense even by the same writer. The confusion generally arises from a want of clearness in distinguishing between cost and expenses of production. The cost of production in its original meaning signifies the amount of inconveniences and exertions necessary for the production of any commodity. Used as equivalent to expenses of production, it signifies the wages and profits expended on the production of the article. It is the ultimate basis of value of articles which can be indefinitely multiplied, and regulates the minimum value of articles which are limited in quantity.

Profession, the act of taking the vows by the member of a religious order after the novitiate is finished. See *Monastic Vows*.

Professor, the title given to salaried teachers in universities and similar institutions who are appointed to deliver lectures for the instruction of students in some particular branch of learning. In Oxford and Cambridge, the professors, and the instruc-

tion which they convey by lectures, are only auxiliaries instead of principals, the necessary business of instruction being carried on by the tutors connected with the several colleges. In the universities of Scotland and Germany, on the other hand, the professors are at once the governing body and the sole recognized functionaries for the purposes of education.

Profit, the gain resulting to the owner of capital from its employment in buying and selling, in manufacturing, or in any commercial undertaking.—*Net profit* is the difference in favour of a seller between the selling price of commodities and the original cost after deducting all charges.—The *rate of profit* is the proportion which the amount of profit derived from an undertaking bears to the capital employed in it.—*Profit and loss*, the gain or loss arising from goods bought or sold, or from any other contingency. In *book-keeping* both gains and losses are titled *profit and loss*, but the distinction is made by placing the former on the creditor side, and the latter on the debtor side.

Prognath'ic, or PROGNATHOUS, in ethnology, a term applied to the skull of certain races of men in whom the jaw slants forwards by reason of the oblique insertion of the teeth. It is determined by the size of the facial or cranio-facial angle. See *Facial Angle*.

Progne, PROCNE. See *Philomela*.

Progno'sis, in medicine, the pre-judgment of the physician regarding the probable course and result of a disease. Such a judgment is based upon the known character of the disease modified by the age, sex, environment, previous health, &c., of the patient.

Progression, in mathematics, a regular or proportional advance in increase or decrease of numbers. Continued *arithmetical progression* is when the terms increase or decrease by equal differences. Thus, 2, 4, 6, 8, 10, and 10, 8, 6, 4, 2, increase and decrease by the difference 2. *Geometrical progression* is when the terms increase or decrease in a certain constant ratio, as 2, 4, 8, 16, 32, 64, and 64, 32, 16, 8, 4, 2, which respectively increase and decrease by a continual multiplication or division by 2. Or, generally, a, ar, ar^2, ar^3, ar^4, &c.,

$$a, \frac{a}{r}, \frac{a}{r^2}, \frac{a}{r^3}, \frac{a}{r^4}, \text{ &c.,}$$

where a is the first term, and r the common ratio in the one case, and $1 \div r$ the common ratio in the other.—*Harmonical progression* is progression in harmonical proportion, or such that of any three consecutive terms the first is to the third as the difference between the first and second to the difference between the second and third, as for example, $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, &c.

Prohibition, specifically applied in economics to the result which arises out of the tariff or duties imposed upon imported goods, when this tariff is so large as to prevent foreign competition with native industries.

Projec'tiles, THEORY OF, is that branch of mechanics which treats of the motion of bodies thrown or driven some distance by an impelling force, and whose progress is affected by gravity and the resistance of the air. The most common cases are the balls projected from cannon or other firearms. If thrown horizontally, the body will move in a curved path, because it retains unchanged (leaving out of account the resistance of the air) its horizontal velocity, while it falls faster and faster towards the ground. A body projected obliquely has initially a certain horizontal velocity and a certain vertical velocity. It retains its horizontal velocity unchanged, but its vertical velocity is altered by the force of gravity, and in both of these cases we find that the path of the projectile is a parabola. With a given velocity the greatest range of a projectile is obtained by projecting at an angle of 45° with the vertical. The actual path of a bullet is always within the parabola of the theoretical projectile, and hence the range of a gun is much less than what the parabola would give. The range depends also upon the shape and weight of the projectile as well as upon its initial velocity. See *Gunnery*.

Projection, the representation of something by means of lines, &c., drawn on a surface, especially the representation of any object on a perspective plane, or such a delineation as would result were the chief points of the object thrown forward upon the plane, each in the direction of a line drawn through it from a given point of sight or central point. This subject is of great importance in the making of maps, in which we have to consider the projection of the sphere or portions of it. Projections of the sphere are of several kinds, according to the situations in which the eye is supposed to be placed in respect of the sphere and the plane on which it is to be projected. See *Map*.

Prolap'sus A'ni, the protrusion of the lower part of the rectum through the anus, caused by straining in costiveness, piles, &c. Persons liable to this accident should be careful to regulate their bowels so as to prevent costiveness and consequent straining. Regular bathing of the parts with cold water may also be found useful.

Prolap'sus U'teri, 'falling down of the womb,' or 'bearing down,' a common affection among women who have born large families, but sometimes occurring in virgins, and in very rare cases in infants. What renders the falling down of the womb possible is a general laxity of the parts supporting it, and it may be of various degrees, from the slightest downward displacement to such a descent as causes external protrusion of the womb. When the falling down once begins it always tends to increase, unless means are taken to prevent it. In all cases of this affection the first requisite for cure is prolonged rest in the horizontal position, with the use, under surgical direction, of cold or astringent injections and the various forms of pessary.

Proleta'rii, the name which was given to those Roman citizens who, in the classification of their means by Servius Tullius, stood in the sixth or lowest class. The term has been revived in modern times as a designation of the lowest class of the community; but more frequently the collective appellation *proletariat* is used.

Proloc'utor, the speaker or chairman of the convocation of the Archbishopric of Canterbury or York.

Prologue, the preface or introduction to a dramatic play or performance. It may be either in prose or verse, and is usually pronounced by one person. Prologues sometimes relate to the drama itself, and serve to explain to the audience some circumstances of the action, sometimes to the situation in which the author or actor stands to the public, and sometimes have no immediate connection with either of these persons or subjects.

Prome, a town of Lower Burmah, capital of a district of same name, is situated on the Irrawaddy. It is a large town surrounded by a wall, with extensive suburbs, and, owing to the flat ground on which it is built, it is liable to be inundated by the river. Pop. 30,022.—The district has an area of 2880 square miles, and a population of 322,340.

Prom'erops, a genus of insessorial birds, many of which are remarkable for the beauty of their plumage. They have a longish bill, an extensible tongue, and feed upon insects,

Promerops superba.

soft fruits, and the saccharine juices of plants. One species, *P. superba*, is a native of New Guinea; another, *P. erythrorhynchus*, is a native of Africa.

Prome'theus, in Greek mythology, one of the Titans, brother of Atlas and of Epimetheus, and the father of Deucalion. His name means 'forethought,' as that of his brother Epimetheus signifies 'afterthought.' He gained the enmity of Zeus by bringing fire from heaven to men, and by conferring other benefits on them. To punish this offence Zeus sent down Pandora, who brought all kinds of diseases into the world. He caused Prometheus himself to be chained by Hephæstus (Vulcan) on a rock of the Caucasus (the eastern extremity of the world, according to the notions of the earlier Greeks), where his liver, which was renewed every night, was torn by a vulture or an eagle. He was ultimately delivered by Heracles, who destroyed the vulture, unlocked the chains, and permitted Prometheus to return to Olympus. That is the tradition as shaped by Æschylus, who has a noble tragedy on the subject, the Prometheus Vinctus (Prometheus Bound), while Shelley has also a drama, the Prometheus Unbound. A different version is given by Hesiod.

Promise, in law, an engagement entered into by one person to perform or not perform some particular thing. When there is a mutual promise between two parties it is termed a contract. A promise may either be verbal or written. A verbal promise is in England called a promise by parole, and a written

promise is in technical language there called a covenant. By English law no promise is binding unless it was made for a consideration, but by Scotch law it is always binding whether a consideration was given or not. The law of Scotland makes a distinction between a promise and an offer, the former being an engagement of such a nature that the promiser thinks it unnecessary to secure the consent of the person to whom the promise is made, while the latter is an engagement dependent on the assent of the other party.

Promissory Note. See *Bill.*

Prompter, one placed behind the scenes in a theatre, whose business is to assist the actors when at a loss, by uttering the first words of a sentence or words forgotten.

Prong-buck, or PRONG-HORN ANTELOPE, a species of antelope, the *Antilocapra americana,* or *A. furcifer,* which inhabits the western parts of North America. It frequents the plains in summer and the mountains in winter. It is one of the few hollow-horned antelopes, and the only living one in which the horny sheath is branched, branching being otherwise peculiar to deer which have bony antlers.

Pronoun, in grammar, a word used instead of a noun or name, or used to represent an object merely in relation to the act of speaking; thus it neither designates its object in virtue of the qualities possessed by it, nor always designates the same object, but designates different objects according to the circumstances in which it is used. The *personal pronouns* in English are *I, thou* or *you, he, she, it, we, ye,* and *they.* The last is used for the name of things, as well as for that of persons. *Relative pronouns* are such as relate to some noun going before called the antecedent; as the man *who,* the thing *which. Interrogative pronouns,* those which serve to ask a question, as *who? which? what? Possessive pronouns* are such as denote possession, as *my, thy, his, her, our, your,* and *their. Demonstrative pronouns,* those which point out things precisely, as *this, that. Distributive pronouns* are *each, every, either, neither. Indefinite pronouns,* those that point out things indefinitely, as *some, other, any, one, all, such.* Possessive, demonstrative, distributive, and indefinite pronouns, having the properties both of pronouns and adjectives, are commonly called *adjective pronouns* or *pronominal adjectives.*

Pronunciamento, in Spain and Spanish America, a proclamation against the existing government, intended to serve as a signal of revolt.

Proof. See *Evidence.*

Proof Impression, in printing, a rough impression from types, taken for correction. A first proof is the impression taken with all the errors of workmanship. After this is corrected another impression is printed with more care to send to the author: this is termed a *clean proof.* When this is corrected by the author, and the types altered accordingly, another proof is taken and carefully read over: this is called the *press proof.* In engraving, a proof impression is one taken from an engraving to show the state of it during the progress of the work; also, an early impression, or one of a limited number, taken before the letters to be inserted are engraved on the plate. Proof states of engravings are usually distinguished as (1) *Artists' Proofs,* with no engraved title, sometimes signed in pencil by the painter or engraver, or both. *Remarque* artists' proofs have some mark, frequently a minute part left white, or a design slightly engraved on the margin. (2) *Proofs before Letters,* still without title, but with artist's and engraver's names inserted close to the bottom of the work, and the publisher's name near the lower margin of the plate. (3) *Lettered Proofs,* with title engraved lightly in such a manner as to be easily erased, or in open letters ready for shading, when the title is finally put on the plate for the ordinary impressions.

Propagan'da, an association, the congregation *de propaganda fide* (for propagating the faith), established at Rome by Gregory XV. in 1622 for diffusing a knowledge of Roman Catholicism throughout the world, now charged with the management of the Roman Catholic missions. In close connection with it stand the seminaries or colleges of the Jesuits, and the great majority of the members of the propaganda are Jesuits and Franciscans.

Propagation, the multiplication or continuation of the species of animals or plants. As a technical term it is used chiefly in regard to plants. The most common method of propagating plants is of course by their seed. There are other ways, however, by which plants are propagated naturally. Some, for example, throw off runners from their stems which creep along the ground, and these runners take root at the buds, and send up new plants. The commonest

artificial methods of propagating plants are budding, layering, the various forms of grafting, including inarching or grafting by approach, propagation by offsets and by slips. Some plants (as the potato) are propagated by dividing the tubers or underground stems, each 'eye' or leaf-bud of which sends up a new plant, while a few are propagated by cuttings of the leaves.

Propeller. See *Screw-Propeller.*

Propertius, SEXTUS AURELIUS, a Latin elegiac poet, the date of whose birth is variously given as 57 and 46 B.C. After the end of the civil war he found a patron at Rome in Mæcenas; obtained the favour of the emperor; devoted himself to poetry; became the bosom friend of Ovid; lived mostly in Rome, and died there about 12 B.C. His elegies, of which we have four books, are not so highly esteemed as those of his friends Ovid and Tibullus.

Property Tax, a tax similar to the income-tax (of which indeed it forms a part), being levied at the same rate on the annual value of real property of which a person is owner.

Prophets, among the Hebrews, inspired teachers sent by God to declare his purposes to his people. The ordinary Hebrew word for a prophet is *nâbhi*, generally interpreted as 'one who pours forth or announces.' There are two other words applied to the prophets, namely, *roëh* and *chozeh*, both of which literally signify seer, and are uniformly so translated in the Authorized Version of the Scriptures. In the Septuagint the word *nâbhi* is always rendered *prophêtês*, and in the Authorized Version *prophet.* The literal signification of the Greek word *prophêtês* is 'one who speaks for another;' but the word was generally used as meaning 'one who speaks for or interprets the will of a god.' In the common acceptation of the word its sense has become narrowed to that of a 'foreteller of future events,' but the wider acceptation still remains side by side with this narrower one. From the time of Samuel frequent mention is made of a body of men bearing the general name of prophets. They were members of a school in which young men of all the tribes were instructed in the law, and apparently also in sacred poetry and music. The first school of this nature appears to have been set up by Samuel at Ramah, and there is mention of others at Bethel, Jericho, Gilgal, and elsewhere. It is probable that these schools of the prophets were formed to strengthen the attachment of the Jews to their religion, and to maintain that religion pure. The prophetic order seems to have continued in existence down to the close of the Old Testament canon. Sixteen of them are the writers of books that are admitted into the Old Testament canon. These may be divided into four groups in such a manner as to give us a partial chronological arrangement. First, there are three prophets who belong to the Kingdom of Israel as distinct from that of Judah—Hosea, Amos, Jonah; secondly, there are eight prophets of the Kingdom of Judah—Joel, Isaiah, Jeremiah, Obadiah, Micah, Nahum, Habakkuk, Zephaniah; thirdly, two prophets of the captivity—Ezekiel and Daniel; and fourthly, three prophets of the return—Haggai, Zechariah, and Malachi. To the first group belong also Elijah and Elisha, the two great prophets, who are not the authors of any books in the canon. The chief function of the prophetic order was to maintain the Mosaic theocracy in its purity, and the patriotism which strongly characterizes all the Hebrew prophets was closely connected with their religious zeal. The Jewish people being the chosen of God and the immediate subjects of the divine ruler, it is the constant cry of the prophets that the people should turn to righteousness in order to be delivered from the hands of their enemies. The predictive powers of the prophets have been the occasion of much controversy. The ability of the prophets to foretell the future was generally believed in by the Jews, and in one passage of the Old Testament, Deut. xviii. 22, is made a negative test of the justness of a person's claim to be a prophet. The main controversies with regard to this predictive power turn upon two points — first, the reality of the power, which is by some altogether denied; and secondly, the reference of the prophecies. With regard to the reference of the prophecies the chief controversy is connected with the prophetical writings of the Old Testament supposed to relate to the Messiah. Regarding these prophecies three different positions are taken up by different schools of Biblical critics. Those who deny to the prophets the power of foretelling future events altogether necessarily deny also the reference of the prophecies in question to Christ as the Messiah. Another school, while admitting the reference of at least some of the passages to historical events, contend that in their secondary meaning they have also a refer-

ence to the Messiah. The third school hold that none but the Messianic interpretation is permissible.

Pro'polis, a red, resinous, odorous substance having some resemblance to wax, collected from the viscid buds of various trees by bees, and used by them to stop the holes and crevices in their hives to prevent the entrance of cold air, to strengthen the cells, &c.

Propon'tis, the ancient name of the Sea of Marmora, from being before or in advance of the Pontus Euxinus or Black Sea.

Proportion, in mathematics, the equality or similarity of ratios, ratio being the relation which one quantity bears to another of the same kind in respect of magnitude; or proportion is a relation among quantities such that the quotient of the first divided by the second is equal to the quotient of the third divided by the fourth. Thus 5 is to 10 as 8 is to 16; that is, 5 bears the same relation to 10 as 8 does to 16. Proportion is expressed by symbols, thus:—$a : b :: c : d$, or $a : b = c : d$, or $\frac{a}{b} = \frac{c}{d}$. The above is sometimes called *geometrical proportion* in contradistinction to *arithmetical proportion*, or that in which the difference of the first and second is equal to the difference of the third and fourth. *Harmonical* or *musical proportion* is a relation of three or four quantities such that the first is to the last as the difference between the two first is to the difference between the two last; thus 2, 3, 6 are in harmonical proportion, for 2 is to 6 as 1 is to 3. *Reciprocal* or *inverse proportion* is an equality between a direct and a reciprocal ratio, or a proportion in which the first term is to the second as the fourth is to the third, as $4 : 2 :: 3 : 6$ inversely, that is as $\frac{1}{4} : \frac{1}{3}$.

Proportional Compasses. See *Compasses.*

Proportional Representation, in politics, a system of representation by which political parties are represented according to their numbers, and not in such a manner as that the majority elects all the representatives. Two plans for securing proportional representation have been tried, the one being by providing that voters shall only vote for a proportion of the representatives, say two out of three, or half when the number is even; the other being to give each elector a vote for every one of the representatives and let them give their votes as they please.

Proposition, in grammar and logic, a sentence or part of a sentence consisting of a subject and a predicate, and in which something is affirmed or denied of a subject. Logical propositions are said to be divided, first, according to substance, into *categorical* and *hypothetical;* secondly, according to quality, into *affirmative* and *negative;* thirdly, according to quantity, into *universal* and *particular.*

Proprætor. See *Prætor, Proconsul.*

Propylæ'a, in Greek architecture, the entrance to a temple. The term was employed particularly in speaking of the superb vestibules or porticoes conducting to the Acropolis of Athens. This magnificent work, of the Doric order, was constructed under the direction of Pericles (B.C. 437–433) after the designs of Mnesicles, one of the most celebrated architects of his age.

Propylon. See *Pylon.*

Prorogation of Parliament, the continuance of parliament from one session to another. Parliament is prorogued by the sovereign's authority, either by the lord-chancellor in the royal presence, or by commission, or by proclamation.

Prosce'nium, the part in a theatre from the curtain or drop-scene to the orchestra; also applied to the curtain and the ornamental framework from which it hangs. In the ancient theatre it comprised the whole of the stage.

Proscription, in Roman history, a mode of getting rid of enemies, first resorted to by Sulla in 82 B.C., and imitated more than once afterwards in the stormy years that closed the republic. Under Sulla, lists of names were drawn out and posted up in public places, with the promise of a reward to any person who should kill any of those named in the lists, and the threat of death to those who should aid or shelter any of them. Their property also was confiscated, and their children were declared incapable of honours.

Prose, ordinary spoken or written language, untrammelled by poetic measure, and thus used in contradistinction to *verse* or *poetry.* The true character of prose can be clearly conceived only by considering it in relation to poetry. The two chief states of the inward man may be called the *thinking* and the *poetical* states, and depend upon the predominance of the understanding, or the imagination and feelings. If we think (in the narrower sense of the word) we combine ideas according to the laws of reason; and prose, which is the language of sober thought, is characterized by the abstract-

ness and precision belonging to ideas that occupy the understanding. Artistic and finished prose is among the latest attainments both of nations and individuals, and it would appear that with most nations classical prose writers are fewer than classical poets.

Prosecution, CRIMINAL. By the law of England the solicitor to the treasury is director of public prosecutions in cases where the public interest is mainly concerned. By the law of Scotland that function is assigned to the lord-advocate and his assistants the advocates-depute, and the procurators-fiscal of burghs and counties. In England it is left to the private parties more immediately concerned to institute criminal proceedings. The result of this is that many criminals are allowed to go free merely for want of a prosecutor. See *Public Prosecutor*.

Pros'elyte (Greek, *prosēlytos*, a stranger or new-comer), a person who leaves one religion for the profession of another. The Jews, in New Testament times at least, had two classes of proselytes, namely, the 'proselytes of the gate,' as they were termed; and the 'proselytes of righteousness,' or of the covenant. According to the rabbis the proselytes of the gate were those who renounced idolatry and worshipped the only true God according to the (so-called) seven laws of the children of Noah, without subjecting themselves to circumcision and the other commands of the Mosaic law. The proselytes of righteousness were persons who had been fully converted from paganism to Judaism, had been circumcised, and bound themselves to observe the Mosaic law.

Proserpine. See *Persephonē*.

Prosim'iæ, a name applied to the lemurs and their allies.

Prosobranchiata, an order of gasteropods comprising the whelks, periwinkles, &c., mostly marine, though some inhabit fresh water.

Pros'ody, that part of grammar which treats of the quantity of syllables, of accent, and of the laws of versification. Though chiefly restricted to versification, it may also be extended to prose composition. In the Greek and Latin languages every syllable had its determinate length or quantity, and verses were constructed by systems of recurring feet, each foot containing a definite number of syllables, possessing a certain quantity and arrangement. The versification of modern European languages, in general, is regulated mainly by accent and number of syllables, though the weight or quantity of syllables has also to be taken into account if harmonious verse is to be produced.

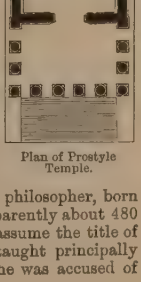
Proso'pis, a genus of tropical leguminous trees of the sub-order Mimoseæ, having their pods filled between the seeds with a pulpy or mealy substance. Some of them yield useful products, as resin or tannin, food for cattle, &c. See *Mesquite*, *Algarobilla*.

Prosopopœ'ia, a figure in rhetoric by which things are represented as persons, or by which things inanimate are spoken of as animated beings, or by which an absent person is introduced as speaking, or a deceased person is represented as alive or present. It includes *personification*, but is more extensive in its signification.

Prosper of Aquitaine, a Christian writer who lived during the early part of the 5th century, but of whom little is personally known. A large part of his life seems to have been spent at Marseilles, where he was connected with an ascetic order. It was here that he wrote his polemical poem Adversus Ingratos, and it is supposed that he finished his Chronicon Consulare (a continuation of Jerome's chronicle) at Rome about 455.

Prossnitz, a town of Austria, in Moravia, 11 miles S.S.W. of the town of Olmütz. It has manufactures of woollen and linen cloth and one of the largest corn-markets in Moravia. Pop. 18,417.

Prostate Gland, a colourless glandular mass, situated in the pelvic cavity, and which surrounds the neck of the bladder and urethra in males. It is liable to enlargement, especially in old age, and is often the seat of various diseases.



Plan of Prostyle Temple.

Prostyle, in architecture, applied to a portico in which the columns stand out quite free from the wall of the building to which it is attached; also applied to a temple or other structure having pillars in front only.

Protag'oras, a Grecian philosopher, born at Abdera, in Thrace, apparently about 480 B.C. He was the first to assume the title of Sophist, and as such he taught principally at Athens. In 411 B.C. he was accused of

atheism, for beginning one of his works (Peri Theōn—Concerning the Gods) with the words, 'Respecting the gods, I am unable to know whether they exist or do not exist.' He seems to have died soon after, perhaps in the same year. He was the author of a large number of works, all of which are lost.

Protea'ceæ, a natural order of arborescent apetalous exogens, chiefly natives of Australia and the Cape Colony. They are shrubs or small trees, with hard dry opposite or alternate leaves, and often large heads of showy and richly-coloured flowers, which render them favourite objects of cultivation. The typical genus *Protea* is African and contains numerous species. *Banksia* is a well-known Australian species bearing the popular name of honeysuckle.

Protection, applied in economics to an artificial advantage conferred by a government or legislature on articles of home production, either by means of bounties or (more commonly) by duties imposed on the same or similar articles introduced from abroad. Such duties may be simply *protective*, that is, such as that the foreign and home articles can compete in the market on nearly equal terms; or *prohibitory*, that is, such as to exclude foreign competition altogether. See *Free-trade*.

Protector, a title conferred on several occasions by the English parliament upon those appointed to act as regents, generally during the minority of the king. Among those who have held this office are Richard, duke of York (1454); Richard, duke of Gloucester (1483); and the Duke of Somerset (1547). In 1653 the title of lord-protector was bestowed upon Cromwell, as head of the Commonwealth of England, and after his death (1658) his son Richard also held the title for a short period.

Pro'teids, a name given to substances analogous in composition to protein, that is, consisting of carbon, hydrogen, oxygen, and nitrogen, sometimes united with sulphur and phosphorus. The gluten of flour, albumin, the fibrin of the blood, syntonin, which is the chief constituent of muscle and flesh, and casein are examples of proteids. Proteids are the essential food-stuffs.

Pro'tein, a hypothetical principle of food, obtained from animal or vegetable albumin, fibrin, or casein, which are all considered to be modifications of it.

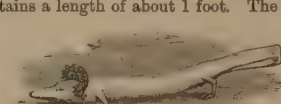
Pro'teles. See *Aardwolf*.

Protest', a formal declaration by the holder of a bill of exchange or promissory note, or by a notary public at his request, that acceptance or payment has been refused, and that the holder intends to recover all the expenses to which he may be put in consequence thereof.

Protestants, a name given to the party who adhered to Luther during the Reformation in 1529, and protested, or made a solemn declaration of dissent from a decree of the emperor Charles V. and the diet of Spires, and appealed to a general council. The protesting members were the electors John of Saxony and George of Brandenburg, Princes Ernest and Francis of Brunswick-Lüneburg, Philip, landgrave of Hesse, and Wolfgang, prince of Anhalt, together with fourteen imperial cities, the chief of which were Strasburg, Nürnberg, Ulm, and Constance. (See *Reformation*.) The name is now applied generally to those Christian denominations that differ from the Church of Rome, and that sprang from the Reformation.

Pro'teus, in classical mythology, a marine deity who fed the flocks (seals) of Poseidōn (Neptune) in the Ægean Sea. He is represented as a soothsayer who prophesied only when compelled by force and art, and who tried every means to elude those who consulted him, and changed himself, after the manner of the sea gods, into beasts, trees, and even into fire and water.

Proteus, a genus of perennibranchiate batrachians. One species only has been hitherto discovered, namely, the *Proteus anguīnus*, which is found in subterranean lakes and caves in Illyria and Dalmatia. It attains a length of about 1 foot. The body



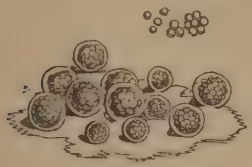
Proteus anguinus.

is smooth, naked, and eel-like, the legs four in number, small and weak, the forefeet three-toed, the hinder four-toed, and, in addition to permanent external gills, it possesses lungs in the form of slender tubes. From its inhabiting places devoid of light the power of vision is unnecessary, and in point of fact its eyes are rudimentary and covered by the skin.

Prothonotary, a term for certain functionaries connected with the papal court who receive the last wills of cardinals, make

informations and proceedings necessary for the canonization of saints, &c.

Protococ'cus, a genus of algæ. *P. nivālis* (red-snow) appears on the surface of snow, tinging extensive tracts in the Arctic regions or amongst the Alps, in an incredibly short space of time, with a deep crimson.



Protococcus nivalis (Red-snow), magnified and natural size.

This plant, which may be regarded as one of the simplest forms of vegetation, consists of a little bag or membrane forming a cell. A large number of these are commonly found together, but each one is separate from the rest, and is to be regarded as a distinct individual.

Pro'tocol, in diplomacy, a document serving as a prelimary to, or for the opening of, any diplomatic transaction; also, a diplomatic document or minute of proceedings, signed by friendly powers in order to secure certain political ends peacefully.

Pro'togene (-jēn), a species of granite composed of felspar, quartz, mica, and talc or chlorite; so called because it was supposed to have been the first-formed granite. It occurs abundantly in the Alps of Savoy, and is found in Cornwall, where, on decomposition, it yields china-clay or porcelain-earth. It is also called *Talcose-granite*.

Protogenes (prō-toj'e-nēz), a Greek painter, contemporary with Apelles, born at Caunus in Caria, flourished between 332 and 300 B.C. Protogenes is said to have lived in comparative obscurity at Rhodes till the fiftieth year of his age, when his merits were made known to his fellow-citizens through a visit of Apelles. It was probably after this visit of Apelles that Protogenes went to Athens, where he executed one of his finest pictures.

Protophytes, a name given to the lowest organisms in the vegetable kingdom, consisting either of a single cell, or of several cells united by a gelatinous substance but without any essential mutual dependence, and corresponding to the Protozoa of the animal kingdom.

Pro'toplasm, a substance consisting of carbon, oxygen, nitrogen, and hydrogen, nearly identical with the white of an egg, and constituting the most elementary living matter in animal and plant structures. It is colourless, transparent, and apparently destitute of structure, and is seen in its simplest form in some of the lowest types of animal life, as in the Protozoa. When unrestricted by an imprisoning envelope it is endued (as is seen in *Amœba diffluens*) with the power of extending itself in all directions in the form of mutable processes which can be withdrawn spontaneously, and it has also the power of passing or flowing in minute masses through closed membranes without these masses thereby losing their identity of form. In the form of cells, the skin of which is merely dead and hardened protoplasm, and inclosing a nucleus, or with a nucleus embedded in its substance, it is the structural unit of all organized bodies, constituting not only the basis of the ovum of both plants and animals, but of the tissues themselves in their perfect state, which are mere multiples of such cell-units variously modified. (The nucleus is believed by some to be doubtful, and due to imperfection in the glass.) As the protoplasm in our bodies is continually undergoing waste, a continuous renewal of the material is essential to the continuance of life. Animals, however, cannot elaborate protoplasm from mineral substances for themselves, they being able only to convert by the process of digestion dead protoplasm into living. Plants can, on the other hand, manufacture protoplasm from mineral compounds and the atmosphere, and so they are the storehouse of protoplasmic matter for the animal kingdom. Some biologists prefer the term *Bioplasm* to that of *Protoplasm*, as being more expressive of its function. *Sarcode* is also used similarly.

Protor'nis, the name given to the earliest fossil passerine bird yet known. In size and structure it approaches the lark, and it occurs in the Eocene strata of Glarus.

Protosau'rus, the name given to a fossil monitor lizard, which occurs in the Durham Permian rocks. It was long the earliest known fossil reptile.

Protozo'a, a sub-kingdom including the most lowly organized members of the animal kingdom. The Protozoa may be defined to be animals composed of a nearly structureless jelly-like substance termed *sarcode* or *protoplasm*, not possessing permanent

distinction or separation of parts, without a definite body cavity or trace of a nervous system. The animals present the appearance of a transparent gelatinous cell containing a nucleus. In many, contractile vesicles have been observed which perform the office of a heart. The organs of locomotion are varied. In some of the higher forms movements are effected by means of cilia, in others by long whip-like bristles termed *flagella*, but the most characteristic organs of locomotion are processes named *pseudopodia*, consisting simply of prolongations of the sarcodic substance of the body, which can be emitted and retracted at pleasure. The Protozoa, with the exception of a few inhabiting the bodies of animals, are aquatic in their habits, and, save the sponges, generally of microscopic size. They have not the usual reproductive organs, this function being fulfilled by means of simple cleavage or 'fission,' and, except in the higher forms, they have no differentiated mouth, the food being simply absorbed. From this fact the Protozoa have been divided into those that have a distinct external mouth, and those that have no distinct mouth; but this classification has no great value. A better mode of division is into the three classes of *Gregarinidæ*, *Rhizopoda*, and *Infusoria*. See these terms.

Proudhon (prö-dōn), Pierre Joseph, a French publicist, born at Besançon 1809, died there 1865. He was the son of poor parents, who were unable to pay for his education, but he was enabled to attend gratuitously the college of his native town. At the age of nineteen he entered a printer's office, afterwards became a press reader, and in this way acquired considerable linguistic knowledge, with the result that he wrote an Essai de Grammaire Générale. As a reward for his studious labours he had conferred on him by the Academy of Besançon the *pension Suard*, which yielded him an income of 1500 francs for three years. Political economy now became his chief study, and in 1840 appeared his famous work, bearing on the title-page the question: Qu'est-ce que la Propriété? (What is property?), to which the first page of the treatise contains the answer, 'C'est le Vol' (it is theft). For this treatise, and two others which followed, he was prosecuted at Besançon, but was ultimately acquitted. In 1843 he managed a system of water transport on the Rhône and Saône; settled in Paris in 1847; started various newspapers, and became a leader in the revolution of 1848; was elected a representative for the Seine in the Constituent Assembly; attempted with no success to found a Banque du Peuple; and for his outspokenness in the press he was imprisoned for three years. Besides those already noticed his more important treatises are: Discours sur la Célébration du Dimanche, De la Création de l'Ordre dans l'Humanité, Système des Contradictions Economiques.

Prout, Father. See *Mahony, Francis.*

Prout, Samuel, painter in water-colours, born in Plymouth 1783, died 1852. He received a few lessons in drawing in his native town, and prosecuted his work by industriously sketching from nature. In 1803 he visited, and in 1812 finally removed to London, where he maintained himself by receiving pupils and furnishing drawings for Britton's topographic and architectural publications. He was an occasional exhibitor at the Academy and British Institution from 1803 to 1827, and was one of the earliest members of the Society of Painters in Water-colours. In 1818 he visited the Continent, after which he made repeated artistic tours; he became famous for his drawings of street scenes and the quaint mediæval architecture of Europe. Some of his sea-coast scenes exhibit great power. His drawings are held in much repute.

Provençal Language and Literature, strictly the language and literature of that portion of Southern France known as Provence, but in its widest application the Provençal language includes the Romance form of speech belonging to the inhabitants of a geographical area which comprises the whole south of France (especially Provence, Limousin, Auvergne), with Catalonia and Valencia in Spain. This language was the earliest cultivated of the Romance languages (or those based on the Latin), and at one time was extensively used in literature. It was also called *langue d'oc* in contradistinction to the kindred speech of Northern France, the *langue d'oui;* and yet again it received the name of *lengua lemosina* probably from the wide fame of a few Limousin troubadours. Provençal, as a new and distinct language, appears in historical records about the 10th century, and continued as a medium of living literary expression until about the end of the 13th century. In 1350 a few scholars of Toulouse attempted to revive its decaying glory, and for this purpose composed a treatise on grammar and

poetry called the Leys d'Amors. About the middle of the 15th century the language ceased to be used both for administrative and literary purposes, and it has long been reduced almost to the condition of a *patois*. In the present century such poets as Jasmin and Mistral have endeavoured to resuscitate Provençal as a literary language, and have produced poems of no small value written in the modern form of it; while a society of literary men and scholars (*lou Felibrige*) exists for the purpose of furthering this object. Still Provençal is a language whose interest as a vehicle of literature is mainly in the past. This interest begins in the early part of the 11th century with a didactic poem, based by its unknown author on the De Consolatione Philosophiæ of Boetius; but Provençal literature in its development found most characteristic expression in the amorous lyrics of the troubadours. The earliest of these lyric poets was William IX., count of Poitiers, about the close of the 11th century, who was followed in France, Italy, and Spain by an innumerable band of poets in the Provençal tongue. Most of this poetry was intended to be sung, and not infrequently the poet also composed his own music. Besides the lyric poetry, of which there were various classes, Provençal poetry also existed of a narrative character, in which legendary and historical themes were treated in epical detail. The rapid decay of this Provençal literature, which was almost exclusively the possession of the upper classes, was largely due to political causes. During the war with the Albigenses the social condition of the feudal nobility in the south of France suffered such downfall that thenceforth the art of the troubadour and the minstrel ceased to be lucratively attractive. See *Troubadour*.

Provence (pro-vàns), one of the old provinces of France, lying in the south-eastern part of the country, on the Mediterranean, bounded on the north by Dauphiné and Venaissin, on the east by Piedmont, and on the west by Languedoc. It now forms the departments of Bouches-du-Rhône, Var, and Basses-Alpes, with parts of Vaucluse and Alpes Maritimes. The capital was Aix, and the province was divided into Upper and Lower Provence. Greek colonies were founded here at an early period; and the Romans having conquered all the south-east of Gaul (B.C. 124–123) gave it the name of *Provincia Gallia*, or simply *Provincia* (the province), whence its later name was derived. It passed successively into the hands of the Visigoths, Ostrogoths, Franks, and in 879 became part of the kingdom of Burgundy. It subsequently was ruled by the counts of Arles, and the counts of Barcelona, then by Charles of Anjou (brother of Louis IX. of France) and his descendants, and latterly passed to Louis XI. of France in 1481.

Proverb is a short pithy sentence forming a popular saying and expressing some result of the experience of life in a keen, quaint, or lively fashion. Proverbs have been defined by Cervantes as 'short sentences drawn from long experiences;' by Howell as sayings which combine 'sense, shortness and salt;' by Bacon as 'the genius, wit, and spirit of a nation;' and by Earl Russell as 'the wisdom of many, and the wit of one.' They have formed an important part of the common wisdom of both eastern and western civilizations, and in this way they are interesting in a study of the spread and structure of language, as it has been pointedly applied to changing manners and customs. Greek and Latin proverbs were collected by Erasmus in his Adagia; English proverbs have been collected by Camden, Howell, Ray, Kelly, Bohn (an enlarged and improved edition of Ray), and Hazlitt; Scotch by Allan Ramsay and by A. Hislop; French by De Lincy; German by various collectors, more especially Wander; Arabic by Burckhardt and by Freytag; Bengali by Long.

Proverbs, one of the canonical books of the Old Testament, usually in the main ascribed to Solomon, in accordance with the superscriptions in chap. i. 1; x. 1; xxv. 1, which, if not written by Solomon himself (as the first two of them may have been), at least represent the traditional views of the ancient Jewish Church. According to modern Biblical critics the book of Proverbs is composed of several sections written by different authors and at different times, and finally collected into a single book at some period subsequent to the return from the captivity. All seem to be agreed that some part of the book is to be ascribed to Solomon, but there is great diversity of opinion as to how large his share is. With regard to the other two contributors to Proverbs named in the book itself, Agur and Lemuel, nothing whatever is known; and in the case of Lemuel it is even suspected that the name is not that of a real personage. The canonicity of the book of Proverbs is represented as a subject of dispute in the Talmud, some having objected to

receive the book as canonical on account of the contradictions it contains. It ultimately found its place, however, in all the Jewish lists of the sacred writings.

Providence, a city of the United States, one of the capitals of the state of Rhode Island (the other being Newport), situated on both sides of the Providence or Seekonk, at the head of Narragansett Bay, 40 miles S.S.W. of Boston. In the centre of the city the river expands into a circular sheet of water called the Cove, nearly a mile in circumference, surrounded by an attractive elm-shaded park. The land on the eastern side of the river is hilly, on the western it is more level. There are many fine public and private buildings. Of the former the most important are the city-hall, library building, court-house, the buildings of Brown University, &c. The industrial establishments include flour and saw mills, cotton and woollen factories, foundries, steam-engine and boiler factories, machine-shops; printing, bleaching, calendering, and dye works, &c. Providence has a safe and commodious harbour, though somewhat difficult of access, and the coasting trade is important. Providence was first settled in the year 1636, incorporated in 1649, and has rapidly increased in size since 1820. Pop. 132,146.

Province, originally a country of considerable extent, which being reduced under Roman dominion was new modelled, subjected to the command of a governor sent from Rome, and to such taxes and contributions as the Romans saw fit to impose. In modern times the term has been applied to colonies or to independent countries at a distance from the metropolis, or to the different divisions of the kingdom itself. Thus the Low Countries belonging to Austria and Spain were styled *provinces*. The different governments into which France was divided previous to the revolution were also called provinces. The name has sometimes been retained by independent states. Thus the Republic of Holland, after it had thrown off the Spanish yoke, was called the United Provinces; and the Argentine Republic used to be called the United Provinces of the Plata. In the canon law the term is applied to the jurisdiction of an archbishop. In the Roman Catholic Church it is also given to the territorial divisions of an ecclesiastical order such as the Franciscans.

Provins (pro-vaṇ), a town in France, department of Seine-et-Marne, 30 miles east of Melun, and 80 miles S.E. of Paris. It has remains of old walls, a tower called Cæsar's Tower, a church of the 12th century, &c. Provins is mentioned in a capitulary of Charlemagne in 802, and in the 13th century it was a large and important city. It derives its modern reputation from its mineral waters, used for bathing and drinking, and from the roses which are cultivated in the district. Pop. 6977.

Provost, a title given to the president of certain bodies, as the heads of several of the colleges in the Universities of Oxford and Cambridge, equivalent to *principal* in other colleges. In the Scotch burghs the provost is the chief magistrate, corresponding to the English mayor. The chief magistrates of Edinburgh and Glasgow are styled *lord provost*, and the same title has been claimed by or popularly given to several others.

Provost-marshal, in the army, is an officer of the rank of a captain, who deals with offences against discipline, brings the offenders to punishment, and sees the sentence executed. In the navy there is a similar office.

Prudentius, AURELIUS CLEMENS, one of the early Christian poets, born at Calagurris in Spain in 348 A.D., died after the beginning of the 5th century. In his latter years he composed a great number of hymns and other poems of a religious nature in which he successfully imitated classical models.

Prudhon (prü-dōn), PIERRE, a French painter, born in 1758, died in 1823. He studied his art at Dijon and in Rome, where he came under the influence of Correggio and of Leonardo. He latterly settled in Paris, where he gradually made his way, and at length became famous by his Truth descending from Heaven, Psyche carried off by Zephyr, Crime pursued by Justice and Divine Vengeance, &c. His importance consists in the fact that, in opposition to David, he accentuated the purely pictorial element and the effect of light in his works.

Prunella, Prunello, a kind of woollen stuff of which clergymen's gowns were once made, and which is still used for the uppers of ladies' boots and shoes.

Prunes. See *Plum.*

Pruning is the severing of portions of the stem, branches, shoots, leaves, or roots of a plant for the purpose of removing excrescent or unprofitable growths, and rendering the sap more conducive to the nutrition of the valuable parts of the plant. The immediate effect of pruning is to reduce the growth of

a plant in as far as it depends on the amount of foliage duly exposed to the light; but as by judicious pruning the parts left have not only a greater share of sap, but are better exposed to the light, its ultimate effect is to produce a larger and stronger plant. From the tendency of sap to flow in increased quantity into the parts immediately adjoining those where its flow has been interrupted, an almost unlimited power is given to the gardener of controlling the direction of the growth of a plant. The season for pruning varies with the nature of the tree and the purpose for which it is pruned. In general it may be said that autumn or winter is the best seasons for extensive pruning; in summer an excess of vigour in the plant may require a little pruning, but in spring it not only weakens the plant but is liable to induce disease. *Root-pruning* is employed to check rapidity of growth and to induce development of flower-buds. The best season for this operation is after the leaves have fallen in autumn or before the sap begins to flow in spring.

Prunus, a genus of arborescent plants belonging to the nat. order Rosaceæ, and comprehending the cherry, bird-cherry, plum, damson, sloe, bullace, apricot, &c.

Pruri'go, a papular eruption of the skin in which the papules are diffuse, nearly of the colour of the cuticle, intolerably itchy, the itching being increased by sudden exposure to heat, and when abraded oozing out a fluid that concretes into minute black scabs.

Prussia (German, PREUSSEN), KINGDOM OF, the leading state of the German Empire, comprising the greater part of Northern and Eastern Germany, and part of Western Germany, divided as in the following table:—

Provinces.	Area—sq. miles.	Population, 1895.
East Prussia	14,280	2,005,078
West Prussia	9,852	1,494,114
Brandenburg	15,405	4,498,708
Pomerania	11,627	1,574,020
Posen	11,182	1,828,195
Silesia	15,562	4,414,460
Saxony	9,747	2,698,712
Schleswig-Holstein	7,295	1,286,330
Hanover	14,855	2,422,174
Westphalia	7,802	2,700,250
Hesse-Nassau	6,059	1,756,554
Rhineland	10,422	5,106,079
Hohenzollern	441	66,121
Total	134,500	31,849,795
Population in 1885		28,318,470
Increase		3,531,325

The average density of the population is 237 to the English square mile, while ten years previously the average was only about 210 per square mile. The Protestants in 1890 numbered 19,232,449, or more than 64 per cent; the R. Catholics 10,251,458, being fully 34 per cent. The capital and largest town is Berlin. Other large towns are Breslau, Cologne, Magdeburg, Frankfort, Königsberg, Hanover, Düsseldorf, Altona. The great bulk of the inhabitants are of the German race, but about 3,500,000 are non-German, including 2,800,000 Poles and 400,000 Jews.

Physical Features.—The whole of northern and eastern Prussia, from Holland on the west to Russia on the east, belongs to the great plain of Northern Europe, and may be described generally as a vast plain, elevated in the south and south-west, and thence descending towards the Baltic and the German Ocean. The loftiest summits are on the southern frontiers, where the Riesengebirge and the Sudetic Mountains form the boundary between Prussia and the Austrian dominions. The highest Prussian mountain is the Schneekoppe in the Riesengebirge (5257 feet). Further to the west the Thuringian forest and the Harz Mountains cover a considerable area, the latter rising in the Brocken to the height of 3742 feet. On the shores of the Baltic and North Sea, large tracts are only saved from inundation by low sand-hills. Behind these hills extensive lagoons, on the Baltic coast called Haffs, have been formed, communicating with the sea by narrow outlets. The chief bays or gulfs are Danzig Bay, Pomeranian Bay, and Kiel Bay, all on the Baltic coast; and on the Baltic coast are the islands of Rügen, Usedom, Wollin, &c.; in the North Sea the North Frisian Islands and East Frisian Islands. The principal river which drains this portion of Prussia is the Elbe, which enters it from the Kingdom of Saxony, flows north-westward, and enters the North Sea between Hanover and Holstein. The Weser, with its tributary the Aller, and the Ems, are the principal rivers west of the Elbe. The Oder lies almost wholly within Prussian territory, and enters the Baltic by the Pommerische Haff. The Vistula or Weichsel flows in a northern direction through Eastern Prussia, and throws off two large branches which enter the Frische Haff, while the main stream passes into the Gulf of Danzig. The other more important rivers are the Passarge, the Pregel, and the Niemen or Memel. Lakes abound in almost every

province, but more especially in those of East and West Prussia, Pomerania, and Brandenburg. The chief coast lagoons are the Pommerische Haff, Frische Haff, and Kurische Haff. The climatic conditions of this extensive territory must necessarily be diversified. The average of a number of places situated between the highest and lowest latitudes gives a mean annual temperature of 52° Fahr.

The south-western division of Prussia, consisting of the greater part of Westphalia, the Rhenish province, and Hesse-Nassau, differs so much from the eastern division as, in many respects, to present a striking contrast to it. In particular, its surface as a whole is much more finely diversified. Its mountains stretch across the country in all directions, and form numerous valleys, one of which, that of the Rhine, in point of fertility and beauty is not surpassed by any other valley in Europe. Though the surface is thus diversified the mountains nowhere reach any great elevation, the highest summit being the Wasserkuppe, on the borders of Bavaria, 3316 feet. By far the greater part of this portion of the Prussian monarchy belongs to the basin of the Rhine, which, entering it on the south-east, traverses it in a N.N.W. direction till it enters Holland. There are numerous streams tributary to the Rhine, the largest being the Moselle with its tributary the Saar. There are no lakes worth mention in this portion of Prussia. As compared with the division already described, the climate of this part of Prussia is milder in winter and cooler in summer, the mean annual temperature being about 1° higher.

Agriculture, &c.—The land in Prussia is much subdivided, especially in the more populous districts, small farms of 3 or 4 acres being the most common holding. In East and West Prussia the soil is for the most part poor; the Rhine valley and the province of Saxony may be considered the most productive portions of the kingdom. Rye is the chief agricultural product, oats are largely grown in the north-east, wheat chiefly in the south and west, while the other grain crops are spelt (an inferior sort of wheat), maize, millet, and barley. Potatoes are extensively cultivated; beet-root for the production of sugar is a very important crop; flax, hemp, and rape-seed cover large areas; tobacco is raised in several provinces; and in the Rhine and Moselle districts the vine is freely cultivated and some of the finest wines produced. In East Prussia horses are reared chiefly for military purposes; cattle are largely exported from the maritime provinces, and in West Prussia and Pomerania sheep are raised in large numbers. Along the Baltic and the North Sea a considerable number of the inhabitants are employed in the fishing industry. The forests cover about 23 per cent of the total area, and are a great source of wealth, forestry being nowhere better understood than in Prussia. The best wooded provinces are Brandenburg, Silesia, and Rhenish Prussia. In some of the forests the wild boar is common, other wild animals being the wolf, lynx, wild-cat, &c.

Mining and Manufactures.—Mining is one of the chief branches of Prussian industry; the most important mineral products being coal and lignite, iron, copper, lead, silver, and zinc, while other minerals produced to a greater or less extent are cobalt, nickel, arsenic, antimony, manganese, rock-salt, kainit and other potash salts, alum, and copperas. About a third as much coal is raised in Prussia as in Britain, the chief coal-fields being in the Rhine province, Westphalia, and Silesia. Iron is found in all parts, the principal areas being Westphalia, Silesia, the Rhine province, and the Harz; copper is found chiefly in the Harz and Westphalia; silver chiefly in Hanover; lead is found in Silesia, the Rhenish province, Westphalia, and Saxony; zinc in the same localities, except Saxony; cobalt in Westphalia and Saxony; arsenic in Silesia. The total value of the metals produced annually is £11,000,000 or £12,000,000. Amber is found along the shores of the Baltic. The chief textile manufactures are those of linens, cottons, and woollens. Silesia, Brandenburg, and Westphalia, are the provinces in which the linen industry is chiefly developed; the cotton manufacture is most extensive on the Rhine; the woollen manufacture has its chief seats in Brandenburg and the Rhenish province; while silk and velvet are made in the Rhine valley, as also at Berlin. In iron and steel ware the chief manufacturing centres are Essen, Solingen, Aix-la-Chapelle, and Burtscheid. The manufacture of porcelain and the finer kinds of ware is extensive, and leather and paper making are large industries. Other manufactures of national importance are beet-root sugar, chocolate, chicory, chemical products, and tobacco.

Trade and Commerce.—Prussia carries

on a large trade both by sea and with its inland neighbours. The principal exports are textile fabrics, yarn, metals and metal wares, agricultural produce and live stock, wool, chemicals, spirits, coal, timber, leather, stoneware and glass, &c.; and the imports are chiefly in the raw materials connected with the textile and other manufactures, and tea, coffee, sugar, and other colonial products. Besides the ordinary road and canal communication, Prussia has an extensive system of railways 17,500 miles) which in time will become wholly national property. The principal ports are Memel, Pillau, Königsberg, Danzig, Stettin, Stralsund, Kiel, and Flensburg on the Baltic; and Altona on the North Sea. In some of these ports, and particularly Stettin, shipbuilding is carried on with considerable activity. The system of money, weights, and measures is the same as that of the rest of Germany. See *Germany*.

Government, Administration, &c.—Prussia is a monarchy hereditary in the male line, the present constitution of which was framed by the government, with the aid of the constituent assembly, in 1850, and subsequently modified by royal decrees. The king is assisted in the executive by an irresponsible privy-council and by a cabinet which is nominally responsible to a legislative assembly composed of two chambers. The upper chamber (Herrenhaus) is composed of princes of the blood of the reigning and former sovereign families of full age, the heads of the mediatized principalities, the territorial nobility created by the king, life peers chosen by the king, and a few titled nobility elected by resident landowners, &c. The second chamber or House of Deputies (Haus der Abgeordneten), since the enlargement of the kingdom, consists of 433 members, being 1 to every 69,000 of the population. The primary qualification of electors is based on taxation, and the primary electors are divided into three classes. The first division consists of those who pay the highest taxation, the second who pay the medium, and the third of those who pay the lowest amounts. The indirect electors (Urwähler) elect the direct electors (Wahlmänner), who choose the representatives. The deputies are chosen for three years. The annual revenue and expenditure usually amount each to over £90,000,000, while the total national debt is about £317,000,000. The principal items of revenue are direct taxes, state railways, domains and forests. For local administrative purposes the kingdom is divided into provinces, governmental departments, circles, and communes, and all recent legislation has tended to reinforce local authority and discourage centralization. At the head of each province is a president or governor and also a military commandant. Prussia is by far the most important state in the German Empire, to the Bundesrath or Federal Council of which it sends 17 members, while to the Reichstag or Diet it sends 236 deputies (more than half the total number). Although the reigning family and nearly two-thirds of the total population are Protestant, absolute religious liberty is guaranteed by the constitution. The clergy, both Protestant and Roman Catholic, are paid by the state. A complete system of primary, secondary, and university education exists, all grades of schools being linked together according to a definite scheme or schemes of study. Elementary education is enforced by law, maintained by local taxes, and administered by local authority. Prussia has ten universities—Berlin, Bonn, Breslau, Göttingen, Greifswald, Halle, Kiel, Königsberg, Marburg, and Münster, attended by some 15,000 students in all. All private as well as public educational establishments are placed under the superintendence of the minister of public instruction, and all public teachers are regarded as servants of the state. The Prussian army and navy form an integral part of those of Germany in general. See *Germany*.

History.—The historical development of the Prussian Kingdom is closely associated with three important elements. The first of these is found in the growing power of the Electorate of Brandenburg, which formed the nucleus of the future kingdom; the second relates to the acquirement of the province of Prussia, which gave its name to the new heterogeneous territory; and the third is associated with the rule of the Hohenzollern family, under whose skilful diplomatic and military guidance the small Brandenburg electorate has grown into what is now considerably the larger portion of the German Empire. Brandenburg, which had been conquered by Charlemagne in 789, was erected into a margraviate by Henry I. (the Fowler), emperor of Germany in 926. Albert the Bear, who received Brandenburg as a fief from the Emperor Lothaire (1134), conquered the Slavonian Wends, and took in 1157 the title

of Margrave of Brandenburg. His dynasty continued to bear rule till 1320, and during this period German civilization was gradually extended in Pomerania, Saxony, Brandenburg, and Silesia. After its extinction there followed a period of anarchy, during which Brandenburg fell as a lapsed fief to the empire, and Louis of Bavaria gave it to his son. Remaining under Bavarian rule for three electorates it was subsequently ceded to the house of Luxemburg, and Charles IV., the first imperial representative of this house, gave it successively to his sons Wenceslaus (1373) and Sigismund (1378). The latter being in debt received from Frederick, the burgrave of Nürnberg, a loan of 400,000 gold florins, for which Frederick held Brandenburg in pawn, and subsequently acquired it in full. This burgrave was the descendant of Conrad of Hohenzollern, a cadet of a Suabian family to whom belonged a small territory surrounding the ancestral castle of Hohenzollern, of which they traced their lordship back to the time of Charlemagne. Brandenburg, which Frederick had thus acquired, was covered with feudal strongholds, which he gradually reduced, and he also added the two small territories of Ansbach and Baireuth. Frederick II., who succeeded his father in 1440, extended the possessions of his family by policy as well as by valour. In 1470 he abdicated in favour of his brother Albert III., surnamed Achilles, who, by a family ordinance, prepared the way in an important respect for the future greatness of his house by providing for the undivided descent of the dominions in connection with the electorate. His grandson, Joachim II., who succeeded in 1535, embraced the Reformation, and established Lutheranism in 1539. In 1537 he acquired the reversion of the principalities of Liegnitz, Brieg, and Wohlau. John George succeeded in 1571. Joachim Frederick, who succeeded in 1598, married his son John Sigismund to the daughter of Frederick Albert, duke of Prussia; and in 1618 John Sigismund united the duchy of Prussia to the electorate, thus bringing it about that the whole country became known as Prussia.

The Prussians were a Slavonic people inhabiting the coast territory situated between the Vistula and the Niemen. Their neighbours, the Poles, endeavoured to convert them to Christianity, and to this end they (1283) conquered the whole country with the aid of the Teutonic Knights of St. George. As the price of this assistance the knights claimed the conquered territory, and established themselves in castles and walled cities. Their rule, which was a despotic oligarchy, was finally overturned by the combined forces of the Prussians and the Poles, and in 1466 West Prussia was ceded to Poland and East Prussia made a fief of the Polish crown under a grand-master, and latterly under a duke. It was as successor to Duke Frederick Albert his father-in-law that John Sigismund obtained the duchy of Prussia. By the treaty of Xanten (1614) Clèves, La Marck, &c., were assigned to Brandenburg, and thus was laid the foundation of the Prussian Rhine-province.

John Sigismund was succeeded in 1619 by his son George William, who was a weak and vacillating ruler, unequal to encounter the terrible crisis that now occurred in the affairs of Germany, the Thirty Years' war. During this war the electorate became the battle-ground of the contending forces, and suffered severely, being at the death of the elector in 1640 occupied by Swedish troops. A very different man was his son Frederick William (which see), called the Great Elector, who may be regarded as the virtual founder of the Prussian monarchy. He found his country weak, and left it strong and with its boundaries extended, and provided with a well-equipped army and a well-filled treasury. Dying in 1688 he was succeeded by his son Frederick, who in 1701 had himself crowned as king, being the first King of Prussia. Under his rule the Prussian troops fought side by side with the English at Blenheim, Ramillies, Oudenarde, and Malplaquet. Frederick I. was succeeded by his son (1713) Frederick William I., who governed Prussia till 1740. His reign was on the whole peaceful, and the country grew greatly in population, industry, and wealth. He went to war with Charles XII., and acquired part of Pomerania, with Stettin, from Sweden. At his death he left a prosperous country, a well-supplied treasury, and an army of 80,000 men to his successor.

Frederick II., surnamed the Great (which see), succeeded to the crown on the death of his father in 1740. In less than a year after his accession he proclaimed war against Maria Theresa in order to enforce his claim to the Silesian principalities, and invaded Silesia. At the persuasion of England Maria Theresa entered into negotiations with him, but failed at first to come to an understanding. Ultimately, however, by a treaty con-

cluded at Berlin (1742) Frederick obtained the cession, with the exception of some specified districts, of both Upper and Lower Silesia, and of Glatz. Conceiving that the Austrians might seek to regain this territory, Frederick in 1744 invaded Bohemia, and commenced what is called the Second Silesian war. He was at first compelled to retreat, but subsequently gained such successes, that when peace was concluded in 1745, Austria confirmed the cession of Silesia, which was guaranteed by Great Britain. Prussia now enjoyed an interval of prosperous peace, which the king was desirous to maintain. But his continued success had aroused the fear of Austria and the enmity of France and Russia, so that these powers projected a scheme of conquest which embraced the partition of Prussia. Before their plans could be matured Frederick invaded Saxony, entered Dresden, and published the despatches which proved the existence of the scheme. England now openly entered into a defensive alliance with Frederick, and subsidized him. The allies, whose plans had been discovered, Austria, France, Russia, and Sweden prepared for immediate hostilities. In the Seven Years' war (which see) following upon this movement, the immense forces which his enemies were able to bring into the field reduced Frederick to the greatest straits, and gave opportunity for the development of his strategic genius. Towards the close of the war the English cabinet began to draw off from the Prussian alliance, but the death of the Empress Elizabeth (1762) broke up the alliance against Prussia, and the Peace of Hubertsburg (1763) put an end to the war. According to Frederick's calculation 886,000 men had perished in a war which failed in effecting any territorial change; but it transformed Prussia into one of the chief European powers. Frederick determining again to extend his boundaries entered into an alliance with Austria, and invaded the territories of Poland. Negotiations followed with Russia, and in 1772 the partition of Poland was arranged in a treaty between the three powers. In this way Prussia obtained most of Pomerania and a large portion of Poland. (See *Poland*.) Frederick died in 1786, and was succeeded by his nephew Frederick William II.

The new king had neither the military skill nor the strength of character possessed by his predecessor. He continued the absolutism, but curtailed some of the freedom of the former reign. In 1788 he made a useless armed intervention in the affairs of Holland, and in 1791 interfered in the affairs of France on behalf of Louis XVI. In 1792, war having already been declared by the French authorities against the empire, the Prussians, under the Duke of Brunswick, invaded France. They were defeated by Kellerman at Valmy, and soon afterwards Frederick William withdrew from this war with France, in which he had been the most active promoter. Then followed a second and a third partition of Poland (1793, 1795), by which Prussia acquired a considerable accession of territory. By the treaty of Basel concluded in 1795 with the French Republic Prussia openly abandoned her connection with the other European powers, and in a secret treaty of the following year France was permitted to advance her frontier to the Rhine, while a new line of neutrality was formed by which Saxony and other South German states withdrew their support from the empire. Frederick William died in 1797, and was succeeded by Frederick William III. Continuing his father's policy in regard to France, he courted the French directorate, and at the Peace of Lunéville (1801) Prussia was indemnified by 4116 square miles ceded at the expense of the empire. In 1804 Prussia recognized Napoleon as Emperor of France, and in the campaign which ended in the overthrow of Austria at Austerlitz (1805) remained neutral. This attitude was at first successful, but ultimately it led to distrust among the German states, and by the formation of the Confederation of the Rhine Prussia was isolated and left to the mercy of Napoleon. At the instigation of the latter Prussia had occupied Hanover, but Napoleon treated this fact with contemptuous indifference when he offered to restore Hanover to England. In his indignation at this insult Frederick William declared war against France without an ally. Although the Prussian army numbered 180,000 men, the French emperor was able to put a larger force in the field. On the 14th October, 1806, the armies met at Jena and Auerstädt, where the Prussians were completely defeated, and the whole country was soon in the hands of Napoleon, who entered Berlin in triumph. At the Peace of Tilsit (June 1807), concluded between Prussia and Napoleon, all lands between the Rhine and the Elbe were ceded to Napoleon for his free disposal, a war indemnity of 140,000,000 francs was imposed

on the mutilated kingdom, and Frederick William was also under treaty obligation not to maintain an army of more than 42,000 regular troops during the next ten years. The years which followed this national disaster were chiefly remarkable for the sweeping internal reforms which the crisis necessitated, carried out under Baron Stein and Baron Hardenberg, and almost amounting to a revolution. The restriction of the army to 42,000 was evaded by replacing rapidly the drilled men by another body of undrilled men. Thus, after Napoleon's disastrous Russian campaign of 1812, Prussia was prepared to take prompt advantage of her opportunity. The king issued a general call to arms, and 150,000 men at once responded. A treaty with Russia was concluded at Kalisch, and the league thus formed was joined afterwards by Austria. In the great struggle for the overthrow of Napoleon which followed (see *France*), an important part was taken by the Kingdom of Prussia, and the Prussian troops along with the British bore a noble part in the Waterloo struggle. At the Congress of Vienna (1815), when the map of Europe was rearranged, Prussia, though losing some possessions, was indemnified with others more extensive and valuable, and was placed in a more advantageous position than before. She now also formed one of the states in the new German Confederacy.

After the restoration Frederick William III. leaned to the despotic counsels of Austria and Russia, supported heartily the Holy Alliance, and entered upon a reactionary policy which continued until his death in 1840. He was succeeded by Frederick William IV., who was expected to grant a constitution to his subjects, but refused the demand of his states to this effect in 1841. In 1847 he tried to anticipate the revolutionary movement spreading throughout Europe by summoning a combined meeting of provincial parliaments at Berlin, but he conferred on them no real power. In the following year, however, after a deadly struggle, in which Berlin was declared in a state of siege, the king dismissed his ministers, and granted a constitution, the details of which were elaborated by a new parliament, and which was formally proclaimed in 1850. The Poles in 1848 revolted against Prussian rule, but the movement was summarily suppressed. In 1848 a deputation of the German national assembly at Frankfort offered the crown of Emperor of the Germans to the King of Prussia, but it was declined. By this time two parties existed in the Germanic Confederacy, one of them desiring Prussia to be the chief state in Germany, to the exclusion of Austria altogether; henceforth there was a strong rivalry between these two states. In 1857, the king being unable to conduct affairs by reason of mental illness, his brother William became regent, and ultimately succeeded to the throne on the death of Frederick William in 1861.

The new king, William I., showed a disposition to absolutism, which in 1862–63 occasioned a lengthened dispute between the chambers and the ministry under Count Bismarck. At this time, on the complaint of the Federal Diet that Denmark had not observed its treaty obligations in regard to the duchies of Schleswig and Holstein, the Prussians, under General Wrangel, entered Schleswig (1864), and Denmark was overpowered. By the Treaty of Vienna, signed Oct. 30, 1864, Denmark gave up Schleswig, Holstein, part of Jutland, and Lauenburg to Germany. In the following year Prussia purchased the claims of Austria over the Duchy of Lauenburg, and it was agreed that Schleswig and Holstein should be administered separately by both powers. But this settlement did not last long. Prussia, which had determined on appropriating them, wished to buy out Austria, but the latter would not cede her claims for money. This led to war between the two powers and to the break-up of the German Confederation, some of the states of which sided with Prussia, others with Austria. On 15th June, 1866, the Prussian troops took the offensive, and the brief campaign which ensued is known as the Seven Weeks' war. The Prussian forces were armed with the new needle-gun, and the whole movements were directed by the chief of the staff, Count von Moltke. The Austrians, under General Benedek, were completely defeated near Königgrätz in Bohemia, where on 3d July was fought the decisive battle of Sadowa; and peace soon followed. A subordinate campaign against Hanover, Bavaria, and other states had been conducted by the Prussians with complete success. After the war Prussia incorporated Hanover, Hesse-Cassel, Nassau, Hesse-Homburg, Schleswig, Holstein, Lauenburg, Hesse-Darmstadt north of the Main, and the principality of Hohenzollern, which already belonged to the royal family. The King of Prussia now invited the States of North Germany to form a new confedera-

tion, which was established on the basis of proposals made by Prussia. The jealousy of France was excited by this powerful confederation, and in 1867 the question of the disposal of Luxemburg brought France and Prussia almost to the point of war. In 1870 Prince Leopold of Hohenzollern consented to become a candidate for the then vacant Spanish throne. This was opposed by the French emperor, who demanded not only that the candidate should withdraw, but that the King of Prussia should pledge himself not to permit any such future candidature. This being refused, war was declared by France on 15th July, 1870, with a most disastrous result to herself. (See *Franco-German War.*) After the German arms had proved entirely successful, on the invitation of the North German parliament supported by the South German states, the King of Prussia assumed on 18th January, 1871, the title of German Emperor.

From this point the history of Prussia is, to a great extent, merged in that of the German Empire. In the hands of Prince Bismarck, acting as premier of Prussia as well as chancellor of the empire, a strong, central, autocratic government has been maintained. Externally his policy has been to secure Germany from attack by France or Russia, and in order to this alliances have been made with Austria and Italy. Internally the legislation of Prussia has been chiefly remarkable in recent years for its anti-clerical and anti-social laws. In 1873 many clerical privileges were suppressed by the laws introduced and carried by M. Falk; but in 1880 an amendment to these was promoted by the premier, and latterly he greatly modified his opposition to the ultramontanes. The social-democrats have also evoked the special antipathy of the Prussian premier, and their success at the elections, especially in Berlin, caused him to promote an anti-social law, which was vigorously applied. In his policy, both home and foreign, Prince Bismarck was supported by the Emperor William I. until the death of the latter in March 1888. He was succeeded by his son, Frederick III., who, when he ascended the throne, was struggling with a deadly throat disease. When he died in June 1888 he was succeeded by his son, William II., who has shown himself a ruler with a mind and will of his own. In 1890 Bismarck retired from his offices, and has since been succeeded by other chancellors of less eminence.

Prussian Blue, a cyanide of iron (Fe_7Cy_{18}) possessed of a deep-blue colour, and much used as a pigment. It is also used in medicine.

Prussian Brown, a colour obtained by adding a solution of the yellow prussiate of potash to a solution of sulphate of copper, which throws down a precipitate of deep brown. This, when washed and dried, is equal to madder, and possesses greater permanency.

Prussic Acid, called also *hydrocyanic* or *cyanhydric acid* (HCN), was discovered by Scheele in 1782, but first prepared in the pure state by Gay-Lussac in 1811. It is a colourless liquid which solidifies at 5° F. to feathery crystals, and boils at 80°. Its specific gravity is about 0·7. It dissolves in all proportions in water, forming a liquid which reddens litmus-paper but slightly. It is found in the kernels of bitter almonds, peaches, apricots, plums, cherries, and quinces; the blossom of peaches, sloes, &c.; the leaves of the beech, cherry, laurel; and various parts of other plants. Pure prussic acid is prepared by passing a stream of dry sulphuretted hydrogen over dry cyanide of mercury. This acid, which is one of the strongest poisons known, is used medicinally to remove various forms of irritation; but in all cases it must be used with extreme caution. When an overdose is administered death is instantaneous, and with a lesser dose the symptoms are convulsions or paralysis. The nature of its action is not clearly understood, but the best antidotes are found to be ammonia, chlorine-water, or a subcutaneous injection of atropine. See *Cyanogen.*

Pruth (pröth), a river of Europe, which rises on the eastern side of the Carpathian Mountains, in the south-east of Galicia; flows circuitously east past Czernowitz, then S.S.E., forming the boundary between Roumania and the Russian government of Bessarabia, and enters the Danube on the left, about 12 miles below Galatz.

Prynne, WILLIAM, pamphleteer and politician, born at Swanswick, Somersetshire, in 1600, and educated at Oxford, where he took his degree in 1620. He then removed to Lincoln's Inn, where he became a barrister, and in 1627 began with Puritan severity to attack prevailing fashions. For a volume denouncing stage-playing, entitled Histrio-Mastix, which was supposed to be levelled at the queen, he was condemned by the Star-chamber to pay a fine of £5000, to stand in the pillory and have both ears

cut off, and to remain a prisoner for life. While in prison he wrote another book, News from Ipswich against Laud, and being condemned again to another fine of £5000, and to lose the remainder of his ears, had the stumps cut off, and was branded on both cheeks. The Long Parliament in 1640 granted his release. Soon after he entered parliament and took a promiuent part in the trial of Laud. After the fall of Charles I. Prynne opposed Cromwell, who had him again imprisoned. At the Restoration he was appointed keeper of the records at the Tower, and died in 1669. He was a most voluminous writer. He had much learning and indefatigable industry, but was very deficient in judgment.

Prytane'um, a public hall in ancient Greek states and cities serving as the common home of the community. That of Athens was the most famous. Here the city exercised the duties of hospitality both to its own citizens and strangers. The prytanes or presidents of the senate were entertained in it, together with the citizens who, whether from personal or ancestral services, were honoured with the privilege of taking their meals at the public cost.

Przemysl (prshem'isl) a town of Austrian Galicia, on the river San, 51 miles west of Lemberg, and 140 east of Cracow. It has two ancient cathedrals and several cloisters; and has recently been strongly fortified. Pop. 22,000.

Psalmana'zar, GEORGE, the assumed name of a literary impostor, born of Catholic parents in the south of France about 1679, died 1763. He studied among the Dominicans, acted as a private tutor; became a common vagrant, and at length assumed the character of a Japanese convert to Christianity, a character which he changed to that of a converted heathen native of the island of Formosa. At this time he became acquainted with a clergyman named Innes, who brought him to London as a convert to the Church of England. Under the patronage of Bishop Compton he translated the Church Catechism into a language which he invented and called Formosan, while he also published a so-called authentic History of Formosa. Various scholars had doubts of his pretensions, and at last he confessed his imposture. For many years after he resided in London, and employed his pen in writing for the booksellers. His Autobiography, published after his death, expresses great penitence for his deceptions. Dr. Johnson had a high opinion of his character and abilities.

Psalmody, the art and practice of singing psalms. The composition of psalm tunes and the performance of psalmody appears to have been practised and encouraged in Germany, France, and the Low Countries before it was introduced into Britain. In France psalmody was popularized at the Reformation by Clement Marot and Claude Goudimel, the former of whom translated the Psalms of David in verse, while the latter set them to music. Psalm-singing was introduced by the Reformers; but Calvin discouraged any but simple melody, while Luther practised and favoured part harmony, as did also John Knox in his psalter. The first English version of the Psalms of David, which appeared soon after that of the French, was made in the reign of Henry VIII., by Thomas Sternhold, groom of the robes to that monarch, and John Hopkins, a schoolmaster, assisted by William Whittyngham, an English divine. It was afterwards superseded by the version of Nahum Tate, the poet laureate, and Dr. Nicholas Brady. The first important compilation of psalm tunes for four voices was published in 1621 by Thomas Ravenscroft, Mus. Bac., and included such well-known tunes as Bangor, St. David's, Norwich, York, &c. Sternhold and Hopkins' version of the Psalms was first used in Scotland, and was afterwards superseded by the version now in use, founded on that of Francis Rous, provost of Eton, a member of Cromwell's government.

Psalms, BOOK OF, one of the books of the Old Testament, containing the liturgical collection of hymns used by the Jews in the temple service. Each psalm in the collection, with a few exceptions, has a particular superscription, such as *Maschil*, instruction, *michtam*, memorial, &c. The chronology of the psalms is much disputed. The earliest (Psalm xc.) is said to have been written by Moses, many are attributed to David, a few are supposed to have been written on the return from the captivity, and some are assigned to the time of the Maccabees. There is an ancient division of the psalms into five books, viz. i.–xli.; xlii.–lxxii.; lxxiii.–lxxxix.; xc.–cvi.; cvii.–cl., which many critics look upon as indicating five distinct collections. Those who take this view place these collections in chronological order as they stand; but this method is considered by the latest criticism to be unwarranted by the

internal evidence of each particular psalm. Nearly eighty are popularly assigned to David, twelve to the singer Asaph, some fourteen to the sons of Korah, two have the name of Solomon, and one is supposed to have been written by Moses. The opinion that some of the psalms are of the time of Samuel has no historical authority, while those by unknown authors are apparently of the latest date. In the Old Testament there are 150 psalms, but in the Septuagint and Vulgate psalms ix. and x. and civ. and cv. are united, while cxvi. and cxlvii. are divided, so that the numbering differs from the English version. In structure the psalms have the strophe and anti-strophe which is so characteristic of Hebrew poetry. It would also seem that many of them were meant to be sung in parts, the chief part by the officiating priest, and a responsive part by the people. The book of Psalms as we have it is essentially the hymn-book of the second temple, and according to the latest criticism, was ascribed to David, merely because the order of the worship in the second temple was the same as that prescribed by him for the first temple.

Psalter, specifically, the version of the Psalms in the Book of Common Prayer; also applied in the Roman Catholic Church to a series of devout sentences, 150 in number, and to a large chaplet or rosary with 150 beads, agreeing with the number of the psalms.

Psaltery, or PSALTERION, an instrument of music used by the Hebrews, the form of which is not now known. That which is now used is a flat instrument in the form of a trapezium or triangle truncated at the top, strung with thirteen chords of wire, mounted on two bridges at the sides, and struck with a plectrum or crooked stick, thus resembling the dulcimer (which see).

Psammetichus (sam-met'i-kus), a king of Egypt who died about 617 B.C. He was one of the twelve kings who reigned simultaneously in Egypt for fifteen years after the expulsion of the Æthiopian dynasty; but being suspected by the other kings of aiming at sole sovereignty he was driven into banishment. With the aid of some Greek mercenaries, however, he defeated the other kings in a battle fought at Momemphis, on the east side of Lake Mareotis, after which he became the sole king of Egypt (671 or 670 B.C.), and the founder of a new dynasty.

Psara, or IPSARA (*Psyra*), an island of Turkey, in the Grecian Archipelago, 7 miles north-west of Scio, about 5¼ miles in length, and as many in breadth.

Pseudepig'rapha (Greek, false additional writings), a term applied in bibliography to a great number of books and fragmentary writings whose claim to a place in the Old and New Testament canons has been denied. Unlike the apocryphal and deutero-canonical books, the pseudepigrapha have no value unless to prove the capacity for forgery which was possessed by the Jew, Gnostic, and Christian of ancient and mediæval times. Among these Old Testament forgeries may be mentioned, The History of Asenath, The Preaching of Noah, The Book of Elias, The Testament of the Twelve Patriarchs, The History of Antiochus, Book of Lamech, Apocalypse of Adam, &c.; while among the New Testament books are the false gospels of James, Matthias, Thomas, Nicodemus, Andrew, History of Joseph the Carpenter, Nativity of Mary, Acts of the Apostles, &c.

Pseudomorph, a mineral having a definite form, belonging not to the substance of which it consists, but to some other substance which has wholly or partially disappeared. Sometimes quartz is found in the form of fluor-spar crystals, the fluor-spar having been changed by a process of replacement or substitution into quartz.

Pseudopo'dia, in zoology, the organs of locomotion characteristic of the lower Protozoa. These consist of variously-shaped filaments, threads, or finger-like processes of sarcode, which the animal can thrust out from any or every part of its body. See *Protozoa*.

Psid'ium. See *Guava*.

Psittacidæ (sit-as'i-dē), the parrot tribe, a family of scansorial birds, comprising over 300 species, of which the genus *Psittăcus* is the type. See *Parrot*.

Pskov, or PLESKOV, a government of Russia, bounded by those of St. Petersburg, Novgorod, Tver, Smolensk, Vitebsk, Livonia; area, 17,069 square miles. The whole government belongs to the basin of the Baltic, the South Dwina, which drains the south-east, carrying its waters into the Gulf of Riga, and the Velikaia, Chelon, and Lovat, with other small tributaries, carrying the rest of the drainage into the Gulf of Finland. The soil is throughout of poor quality, wheat is seldom grown, and the principal crops are oats and barley. Forests are extensive, and the pine furnishes the means of manufacturing large quantities of pitch. Pop. 948,080.

—Pskov, or Pleskov, the capital, is situated on the Velikaia, on which there is regular communication by steamer with Dorpat. It consists of the Kremlin, the Central city, the Great city, and a considerable suburb. Among the chief buildings are the cathedral, and the palace of the ancient princes of Pskov, now occupied by the archbishop. The principal manufacture is Russian leather. Pop. 21,500.

Pso'as, an important muscle of the human body which extends from the lumbar region to the thigh-bone, and assists in the movements of the thigh.

Psora'lea, a genus of leguminous plants, one species of which (*P. esculenta*) is the bread-root of N. America.

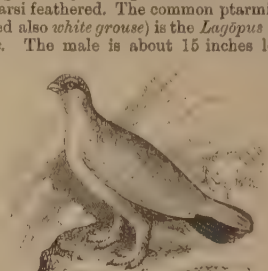
Psori'asis, a kind of skin disease, in which elevated red patches appear covered with large scales, there being often cracks or fissures between, from which blood may ooze. In some cases it is a syphilitic affection. The name is also given to the itch.

Psyche (sī'kē; Greek, *psychē*, the soul), a sort of mythical or allegorical personification of the human soul, a beautiful maiden, whose charming story is given by the Latin writer Appuleius. She was so beautiful as to be taken for Venus herself. This goddess, becoming jealous of her rival charms, ordered Cupid or Love to inspire her with love for some contemptible wretch. But Cupid fell in love with her himself. Many were the trials Psyche underwent, arising partly from her own indiscretion, and partly from the hatred of Venus, with whom, however, a reconciliation was ultimately effected. Psyche by Jupiter's command became immortal, and was for ever united with her beloved.

Psychical Research (sī'ki-kal), Society for, an English society, founded in 1882, 'for the purpose of making an organized attempt to investigate that large group of debatable phenomena designated by such terms as mesmeric, psychical, and spiritualistic.' This society has given its chief attention to *telepathy* (or the power of one mind to influence another mind at a distance and without the usual organs of sense), the results of which have been published in Reports and Proceedings, as well as in a book called Phantasms of the Living.

Psychology (sī-kol'-) is the science or department of philosophy which deals with the phenomena of mind. See *Mind, Metaphysics, Philosophy.*

Ptarmigan (tär'-), a bird of the grouse family (Tetraonidæ), distinguished from the true grouse by having the toes as well as the tarsi feathered. The common ptarmigan (called also *white grouse*) is the *Lagopus vulgāris*. The male is about 15 inches long,



Ptarmigan (*Lagopus vulgāris*), winter plumage.

the female about an inch less. In summer the predominant colours of its plumage are speckled black, brown, or gray, but in winter the male becomes nearly pure white, and the female entirely so. In Britain it is to be met with only on the summits of some of the highest Scottish hills, chiefly amid the Grampians, in the Hebrides and Orkneys, and sometimes but rarely in the lofty hills of Cumberland and Wales. The willow-ptarmigan or willow-grouse (*L. salicēti*) occurs in great abundance in the arctic regions of America and in Norway, whence great numbers are brought to the London market.

Pterichthys (te-rik'this), a fossil genus of fishes belonging to the Old Red Sandstone. The head and forepart of the body were protected by a buckler of large ganoid plates fitting closely to each other. The caudal portion was free and seems to have been covered with small round enamelled scales. The pterichthys was peculiarly characterized by the form of its pectoral fins, which were in the form of two long curved spines, something like wings (whence the name—'wing-fish'), covered by finely tuberculated ganoid plates. They appear to have been used for defence as well as progression.

Pteris, the genus of ferns to which the bracken belongs.

Pterocarpus, a genus of leguminous plants, species of which yield kino, dragon's-blood, red sandal-wood, &c.

Pteroceras (ter-o'se-ras), a genus of molluscs inhabiting the Indian Ocean; the scorpion-shells. The head of the animal is fur-

nished with a proboscis and two tentacula, which are short. The shell is oblong, the spire short, and the operculum horny. *P. scorpio* is known by the name of the *devil's-claw*. At the least ten recent and twenty-seven fossil species of this genus are known.

Pterodac'tyl ('winged-finger'), a genus of extinct flying reptiles of the order Pterosauria, found in the Jura Limestone formation, in the Lias at Lyme-Regis, in the Oolite

1, Pterodactyl (restored). 2, Skull of *Pterodactylus longirostris*.

slate of Stonefield, &c. The pterodactyls had a moderately long neck, and a large head; the jaws armed with equal and pointed teeth; most of the bones, like those of birds, were 'pneumatic,' that is, hollow and filled with air; but the chief character consisted in the excessive elongation of the outer digit (or little finger) of the forefoot, which served to support a flying membrane. A number of species have been discovered, most of them small or of moderate size, but one must have had an expanse of wing of at least 20 feet.

Pteromys (ter'o-mis). See *Flying-squirrel*.

Pterop'idæ, a family of cheiropterous mammals, called fox-bats from their long and pointed fox-like head. The type genus is Pteropus. See *Kalong Bat*.

Pterop'oda, a class of molluscs, comprehending those which have a natatory wing-shaped expansion on each side of the head and neck, being thus a sort of 'winged snails.' They are all of small size, are found floating on the surface of the ocean in all parts of the world, and in the arctic and antarctic regions furnish much of the food of the whale. They are all hermaphrodite. Their food consists of minute animals.

Pterosau'ria, an extinct order of reptiles, represented chiefly by the Pterodactyls (which see). This group is especially noted as containing forms which possessed the power of flight.

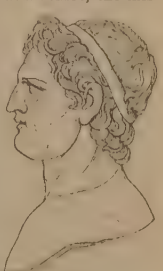
Pterygo'tus, a gigantic fossil crustacean occurring chiefly in the passage-beds between the Silurian and Devonian systems. It has a long lobster-like form, composed in the main of a cephalo-thorax, an abdominal portion of several segments, and a somewhat oval telson or tail-plate.

Pthah, or PHTHA, an ancient Egyptian divinity, the creator of all things and source of life, and as such father and sovereign of the gods. He was worshipped chiefly at Memphis under the figure of a mummy-shaped male, and also as a pygmy god.

Ptolemaic System, in astronomy, that maintained by Claudius Ptolemy, the astronomer, who supposed the earth to be fixed in the centre of the universe, and that the sun and stars revolved around it. This long-received theory was rejected for the Copernican system. See *Astronomy*.

Ptolema'is. See *Acre*.

Ptol'emy (PTOLEMAIOS), the name of a line of Græco-Egyptian kings, who succeeded, on the division of the empire of Alexander the Great, to the portion of his dominions of which Egypt was the head. They were also distinguished by the surname Lagidæ, from Ptolemæus Lagus, the founder of the dynasty.—PTOLEMY I., called *Soter*, the Saviour, was by birth a Macedonian. His mother was Arsinoë, the mistress of Philip, and his father is commonly reputed to have been Lagus, a Macedonian of humble birth. Ptolemy was one of the intimate friends of Alexander, attended the king on his expedition to Asia, was admitted into the body-guard, and in 329 B.C. commanded one of the chief divisions of the army. On the death of Alexander he attached himself to the party of Perdiccas, and secured for himself the government of Egypt. He married Eurydice, daughter of Antipater, and in B.C. 320 he seized the satrapy of Phœnicia and Cœle-Syria. In 308 he invaded Greece, and proclaimed himself



Ptolemy I.—Antique gem.

as a liberator; but he made little progress, and having garrisoned Corinth and Sicyon, which he lost some years later, he returned to Egypt. Antigonus resolved to wrest Cyprus from Ptolemy (B.C. 307), and in a sea-fight at Salamis the Egyptians were defeated, and Cyprus fell into the hands of the victor, who assumed the title of king. Antigonus now advanced against Egypt through Syria with a powerful army, supported by a fleet; but he was ultimately compelled to retire, while a few years later Cyprus was recovered and became a permanent dependency of Egypt. Ptolemy died in B.C. 283. He was a great patron of art, learning, and literature, and founded the celebrated Alexandrian library. —PTOLEMY II. (*Philadelphus*), born B.C. 309, succeeded his father, and reigned in almost complete peace. His chief care as ruler was directed to the internal administration of his kingdom. He spared no pains to fill the library of Alexandria with all the treasures of ancient literature, and among the architectural works erected during his reign were the lighthouse on the island of Pharos, the Alexandrian Museum, and the royal burying-place. He founded numerous cities and colonies, and during his reign the dominion of Egypt extended into Ethiopia, Arabia, and Libya, and embraced the provinces of Phœnicia and Cœle-Syria, besides tracts in Asia Minor and some of the islands of the Mediterranean. Ptolemy died in 247, and was succeeded by his son—PTOLEMY III., surnamed *Euergĕtes* ('benefactor'). He was early engaged in an important war against Syria, which having invaded he advanced without opposition to Antioch, then turned eastward, subduing Mesopotamia, Babylonia, &c. The fleets of Ptolemy had at the same time subdued the coasts of Asia Minor, and carried his arms to the Hellespont and to the coast of Thrace. Ptolemy took some part in the affairs of Greece against the rulers of Macedonia, and maintained friendly relations with Rome. Like his predecessors he was the patron of scholars, and his court was the resort of the most distinguished men of his day. He died in B.C. 222, being succeeded by PTOLEMY IV., surnamed *Philopator*. His Syrian possessions having been gradually wrested from him by Antiochus the Great, Ptolemy put himself at the head of a large army and completely defeated Antiochus at Raphia, in B.C. 217. He latterly gave himself up completely to debauchery, and died B.C. 205. — PTOLEMY V. (surnamed *Epiphănes*), his son and successor, was under five years old at his father's death, and this led Philip of Macedon and Antiochus III. (the Great) of Syria to combine to dispossess Ptolemy, and divide his dominions. To avert this danger the guardians of the young king placed him under the protection of Rome, which thus had first an occasion for interfering in the affairs of Egypt. Ptolemy was poisoned B.C. 181.—PTOLEMY VI. (surnamed *Philomētor*) was a child at the death of his father. His reign was much disturbed by the rivalry of a brother, and being expelled from Alexandria he repaired to Rome B.C. 164, by whose intervention he was replaced. He died in B.C. 146. During the reigns of the succeeding Ptolemies the influence of the Romans in Egypt gradually increased, with a corresponding decrease in the independence of the native sovereigns. The personal character of the Ptolemies also degenerated, a fact to be probably connected with the common practice in the family for brothers to marry sisters.—PTOLEMY XI. (*Aulētēs*, 'flute-player') was driven from his kingdom by his subjects, who were ground down by taxation; but he was restored by the Romans (to whom he gave great sums of money), and died B.C. 51. —PTOLEMY XII. (*Aulētēs*), son of the preceding, reigned jointly with his sister Cleopatra till B.C. 48, when Cleopatra was expelled, and raising an army in Syria invaded Egypt. On the arrival of Cæsar, Cleopatra by her charms acquired an ascendency over him. Ptolemy put himself at the head of the insurgents, was defeated by Cæsar, and drowned in attempting to make his escape, in B.C. 48 or 47.—PTOLEMY XIII. (*Aulētēs*), the youngest son of Ptolemy XI., was declared king by Cæsar in conjunction with his sister Cleopatra in B.C. 47. He was married to his sister, but being only a boy possessed no more than the name of husband or king. Cleopatra caused him to be put to death, and the line of the Ptolemies ended when Cleopatra perished by her own hands after Octavius defeated Antony at Actium, and Egypt became a Roman province, B.C. 30.

Ptolemy (CLAUDIUS PTOLEMÆUS), a Greek astronomer and geographer of the 2d century after Christ. He appears to have resided in Alexandria, where he made astronomical observations in 139, and he was alive in 161. Ptolemy's great astronomical work is entitled Megalē Syntaxis tēs Astronomias, and

is more commonly known by the Arabic title Almagest. His system, founded on the apparent movements of the heavenly bodies, and which is still known by his name, was only superseded by that of Copernicus. See *Ptolemaic System, Astronomy.*

Ptomaine (tō'ma-in), one of a class of alkaloids or organic bases, which are generated in the body during putrefaction, during morbid conditions prior to death, and even, it is said, during normal healthy conditions of life. Some of them are highly poisonous, and in their action may even resemble strychnine.

Pu'berty, the period in both male and female marked by the functional development of the generative system. In males it usually takes place between the ages of thirteen and sixteen; in females somewhat earlier; and, as a rule, in very warm climates puberty is reached somewhat sooner than elsewhere. In males puberty is marked externally by the deepening of the voice, the first appearance of the beard, greater firmness, fulness of body, &c.; in females, by the enlargement of the breasts and by the general rounding out of the frame, and most unequivocally of all by the commencement of menstruation.

Publicans, PUBLICANI (from *publicus*, belonging to the state), the farmers of the taxes levied in the territories of ancient Rome. Naturally they belonged to the wealthier classes, and were from their functions unpopular. Far more unpopular were the subordinates whom they employed to collect the taxes for them. In Palestine, from the strong spirit of nationality among the Jews, many of whom denied the lawfulness of paying tribute, these were specially obnoxious as the agents of the foreign rulers. To this detested class, and not to the *publicani* proper, the 'publicans' of the New Testament belonged generally.

Public Health Acts, certain British acts of parliament regulating sanitary matters. The sanitary administration of England (with the exception of London) is mainly regulated by the provisions of the Public Health Acts of 1875 and subsequent years. The superintending and controlling authority is the Local Government Board. The local sanitary authorities are the county councils, district councils, &c. The local authority, however constituted, is armed with very extensive powers. To aid in the exercise of these it must appoint a medical officer, an inspector of nuisances, and in urban districts a surveyor. As regards the health of a district the local authority can ensure a due supply of water, make and maintain sewers and utilize sewage, provide for the cleansing of streets, remove nuisances of every kind, including those which arise from offensive trades, prevent overcrowding in common lodging and other houses, and enforce a supply of proper privy accommodation. It can close dwellings unfit for human habitation, and if the owner neglects to put them in a proper state can do so at his expense. It can compel the cleansing of houses in which there is infectious disease, and establish temporary hospitals for sufferers from it. For these and many other purposes connected with the health of the community it can levy rates and raise loans. The act of 1875 has been supplemented by others dealing with water-supply, the removal of nuisances, the pollution of rivers, the injurious effects of the vapours from alkali works, the provision of public burial-grounds, compulsory vaccination, and the adulteration of food and drugs, with the appointment of public analysts. For special classes of the community there are the act of 1878 consolidating and amending the laws relating to factories and workshops, the measures regulating labour in mines and bakehouses, the sections of the Merchant Shipping Acts regarding the health of sailors at sea and their housing on land, the Canal Boats Act, and a series of measures for the improvement of the dwellings of artisans and labourers in towns, especially the acts of 1878 and 1885. For Scotland the chief sanitary enactment is the Public Health (Scotland) Act of 1867. The supreme controlling authority is now the Local Government Board, and the local sanitary authority is the town or county councils. For Ireland the chief sanitary enactment is the Public Health Act (Ireland) of 1878, which is framed on the lines of the English act of 1875. The controlling authority is the Irish Local Government Board. The local sanitary authority is either the town council or one of three bodies of commissioners created by previous acts of parliament.

Public-houses. See *Inn* and *License.*

Publicist, a term orignially applied to a writer on international law, now used in England to denote a writer on current politics.

Public Library. See *Library.*

Public Prosecutor, an official charged with the prosecution of all criminal offences.

In England such offences are not taken up by public prosecutors, and unless in a few exceptional cases any private person may institute a criminal prosecution. A salaried director of public prosecutions, with very limited powers, was appointed in 1879, but in 1884 his title and his functions were transferred to the solicitor to the treasury, who prosecutes on behalf of the state in criminal cases of importance or difficulty, or when special circumstances appear to him to justify the step. In Scotland there are practically no private prosecutions for criminal offences. The Lord-advocate is *ex officio* public prosecutor, and the whole expense of public prosecution is borne by the public, criminal prosecutions being initiated by the procurators-fiscal, who are officials specially appointed for this purpose. (See *Procurator-fiscal.*) In Ireland a system of crown solicitors and crown agents has very largely superseded prosecutions by private persons.

Public Schools, the schools, especially the elementary schools, established under any national system of education; but in England the term is often specifically applied to certain important secondary schools or colleges, including Eton, Harrow, Winchester, Rugby, Westminster, St. Paul's, Shrewsbury, &c., known as 'the great public schools of England.'

Public Stocks or Funds. See *Funds.*

Public Works Loan Commission, a body in England authorized to lend the money of the state for useful local purposes. Unless where special acts of parliament, such as the public health and education acts, leave them no option, the commissioners judge for themselves of the sufficiency of the security offered by the applicants for loans, and whether the objects for which they are asked are of adequate utility to justify loans of public money.

Pub'lius (more correctly Publilius) Syrus, Latin writer, so called because a native of Syria, was carried as a slave to Rome about the middle of the 1st century B.C. His master gave him a good education, and afterwards set him free. He excelled in writing *mimi*, or farces, which were interspersed with moral sentences, and a collection of them was used by the Romans as a school-book. A number of apothegms, not all of them composed by him, have been published as Publii Syri Sententiæ. One of them, *Judex damnatur cum nocens absolvitur* ('the judge is condemned when the guilty is acquitted'), has become famous through being adopted as the motto, from the first, of the Edinburgh Review.

Puccinia, a genus of fungi well known to farmers under the name of mildew. The rust or mildew of corn is the *P. graminis.*

Puccoon'. Same as *Blood-root.*

Puck, a celebrated elf, the 'merry wanderer of the night,' whose character and attributes are depicted in Shakspere's Midsummer Night's Dream, and who was also known by the names of *Robin Goodfellow* and *Friar Rush.* He was the chief of the domestic fairies, and many stories are told of his nocturnal exploits.

Pückler-Muskau, Hermann Ludwig Heinrich, Prince of, German traveller and author, was born in 1785. He served in the Tuscan and Russian armies, and after the peace of 1815 devoted himself to literature, landscape-gardening, and travel. One of his works was translated into English by Mrs. Austin as Tour in England, Ireland, and France by a German Prince. Other English translations of works by him are Semilasso in Africa, 1837; A German Sketch-Book (Tutti Frutti), 1839; and Egypt under Mehemed Ali, 1845. He died in 1871.

Pudding-berries, the berries of the Canadian dogwood (*Cornus canadensis*), common throughout N. America.

Pudding-stone, or **Plum-pudding Stone**, a term now considered synonymous with conglomerate, but originally applied to a mass of flint pebbles cemented by a siliceous paste. When select specimens are cut and polished they resemble a section of a plum-pudding, and are used for ornamental purposes.

Puddling Furnace. See *Iron.*

Pud'sey, a town in the West Riding of Yorkshire, 6 miles west of Leeds. Woollen and worsted manufactures are extensively carried on, and there is also a large manufacture of boots and shoes. Pop. 13,444.

Pueb'la, in full **La Puebla de los Angeles**, the capital of a Mexican state of the same name, situated on a plateau 76 miles S.E. of Mexico. It has spacious streets and solidly-built houses, the cathedral being a magnificent structure. It contains a large number of religious edifices, many of them highly decorated. There are also several colleges, a museum, and a theatre. It is one of the chief seats of Mexican manufacturing industry, and its chief products are cotton and woollen goods, leather, glass, earthenware, and soap. Puebla was built by the

Spaniards in 1533–34. Pop. 91,917. The state consists of an elevated plateau, and contains much fertile soil. On the western frontier is the volcano of Popocatepetl, the highest mountain in Mexico. Area, 12,042 square miles; pop. 839,125.

Pueblo Indians are semi-civilized Indians of the Western United States in New Mexico and Arizona, some 9000 in number, living in villages in communal houses (a number of families together), and possessed of considerable skill in agriculture and the simpler kinds of manufacture. Their village communities are self-governed, and they are only nominally citizens of the United States.

Puente-Jenil (pu-en'tā-*he*-nēl'), a town of Spain, prov. Cordova, on the Jenil. Pop. 10,094.

Puer'peral Fever, a dangerous contagious disease peculiar to women in childbed, and due to the absorption of poisonous material by the raw surface of the womb. The poison may originate from decomposing material in the womb itself, but is generally introduced from without.

Puerperal Mania is a form of insanity developed during pregnancy or after childbirth, and is invariably the effect of exhaustion or debility.

Puer'to-Bello. See *Porto-Bello.*

Puer'to-Cabello (kà-bel'yō), or PORTO-CABELLO, a seaport of Venezuela, with a very commodious and well-sheltered harbour, a well-built thriving town. Its principal exports, mainly to the United States and Germany, are coffee and cocoa. Pop. 12,000.

Puerto-de-Santa-Marí'a, commonly called EL PUERTO, a town of Spain, in the province and 7 miles north-east of Cadiz, on the Guadalete, near its mouth in the Bay of Cadiz. It is a great wine-exporting place (especially sherry), with large *bodegas*, or wine-stores. One of its industries is the manufacture of liqueurs. Pop. 22,125.

Puerto-Montt, a seaport of Southern Chili, capital of the province Llanquihue. Pop. 4000.

Puerto-Prin'cipe, an old town in the interior of Cuba, early in the century the seat of the central government and supreme courts of justice of the Spanish West Indies. Its chief manufacture is cigars. It is connected by railway with its port, San Fernando de Nuevitas. Pop. 46,641.

Puerto Real', a Spanish seaport in the province and 7 miles east of Cadiz. Pop. 10,632.

Puerto Rico. See *Porto Rico.*

Pu'fendorf, or PUF'FENDORF, SAMUEL, BARON VON, German writer on the law of nature and nations, born in 1632. He studied theology and law at Leipzig and Jena, and in 1660 appeared his Elementa Jurisprudentiæ Universalis. In 1661 he became professor of the law of nature and of nations at Heidelberg. In 1677 he published his work De Statu Reipublicæ Germanicæ, which, from the boldness of its attacks on the constitution of the German Empire, caused a profound sensation. In 1670 he went to Sweden, became professor of natural law in the University of Lund, and brought out his chief work, De Jure Naturæ et Gentium, and in 1675 an abstract of it, De Officio Hominis et Civis. In 1677 Pufendorf went to Stockholm as historiographer-royal. There he wrote in Latin his vigorous vindication of Protestantism, On the Spiritual Monarchy of the Pope, a History of Sweden from the Campaign of Gustavus Adolphus in Germany to the Abdication of Queen Christina, a History of Charles Gustavus, and in German his Introduction to the History of the Principal States of Europe. In 1686 he received a summons to Berlin from Frederick William, elector of Brandenburg, a history of whom Pufendorf wrote for his son, the first king of Prussia. In 1694 he was created a baron by the King of Sweden, and in the same year he died at Berlin. There are English translations of his principal works.

Puff-adder (*Vipĕra* or *Clotho arietans*), a serpent found in South and Central Africa. Its popular name is derived from its power of puffing out the upper part of the neck when irritated or alarmed. It is very thick, attains a length of 4 or 5 feet, and is extremely venomous. The Bosjesmen poison their arrows with its venom.

Puff-balls, so called from their globular shape, and because if they are struck when ripe the dry spores fly out in powder like a puff of smoke, form the genus of fungi *Lycoperdon.* When young, and whether raw or cooked, some of them are very good eating.

Puff-birds. See *Barbets.*

Puffin, the name for the marine diving birds of the genus *Fratercŭla.* The common puffin (*F. arctica*) is a native of the arctic and northern temperate regions, and is often met with on the rocky cliffs of Great Britain and Ireland. It is about a foot in length, and from the singular shape and enormous size of its bill, which is striped with orange

upon bluish-gray, is often called the sea-parrot or the coulter-neb. Their plumage is glossy black, with the exception of the cheeks and under-surfaces, which are white.

Common Puffin (*Fratercula arctica*).

It breeds upon rocks and in the rabbit-warrens near the sea, and lays one egg, which is white. It lives on fish, crustacea, and insects, and is a gregarious and migratory bird.

Pug'aree, PUGGERIE, the name in India for a piece of muslin cloth wound round a hat or helmet to protect the head by warding off the rays of the sun.

Pugatchef', YEMELYAN, the son of a Don Cossack, born in 1726, was in his youth the leader of a band of robbers. During the Seven Years' war he served in the Russian, Prussian, and Austrian armies successively. Returning to Russia, he attempted to stir up an insurrection, but was arrested and imprisoned. Having made his escape, he pretended to be the murdered czar, Peter III., to whom he bore a strong personal resemblance. He was joined by numbers of the peasantry, to whom he promised deliverance from their oppressions. After several considerable successes, accompanied by frightful cruelty on his part, he found himself at the head of 15,000 men, and was threatening Moscow itself when, betrayed by his followers and separated from his army, he was captured, and in June 1775 executed at Moscow.

Pug-dog, a small dog which bears a miniature resemblance to the bull-dog, and is only kept as a pet.

Puget Sound (pū'jet), an inlet on the north-west coast of the State of Washington, U.S., forming the south-west continuation of Juan de Fuca Strait, with which it is connected by Admiralty Inlet. On its shores are Seattle, Olympia, and other rising towns.

Pugilism. See *Boxing*.

Pugin (pū'jin), AUGUSTIN NORTHMORE WELBY, architect, was born in 1811, the son of Augustus Pugin (see next article), from whom he imbibed a love of Gothic architecture, to promote the revival of which became early the object of his life. In 1834 he became a Roman Catholic, and designed a large number of ecclesiastical buildings for that communion, among them a church at Ramsgate, which was built at his own expense. He assisted Sir Charles Barry in the designs for the new houses of parliament, especially in those for their interior fittings and decorations. The Contrasts, or a Parallel between the Architecture of the 15th and 19th Centuries (1836), The True Principles of Pointed or Christian Architecture (1841), and The Glossary of Ecclesiastical Ornament and Costume (1844), are among his principal works. He died at Ramsgate in 1852. His son EDWARD WELBY, born 1834, died 1875, was also a distinguished architect.

Pugin, AUGUSTUS, architectural draughtsman, father of the above, was born in France in 1762, but settled early in life in London, where for many years he acted as assistant to Nash, the architect. The revival of Gothic Architecture in England was much aided by his Specimens of Gothic Architecture (1821–23) and others of his works. Among these were the Picturesque Tour of the Seine (1821) and Specimens of the Architectural Antiquities of Normandy (1825–28). He died in 1832. His representations of Gothic Architecture, for beauty, accuracy, and thorough mastery of the subject, have never been excelled.

Pug-mill, a machine for mixing and tempering clay. It consists of a hollow iron cylinder, generally set upright, with a revolving shaft in the line of its axis, carrying a number of knives projecting from it at right angles, and arranged in a spiral manner. The clay is thrown in at the top of the cylinder, and by the revolution of the shaft is brought within the action of the knives, by which it is cut and kneaded in its downward progress, and finally forced out through a hole in the bottom of the cylinder.

Puisne (pū'ni), in law, younger or inferior in rank. The several judges and barons of the divisions of the high court of justice, other than the chiefs, used to be called puisne judges.

Pulci (pul'chē), LUIGI, an Italian poet, born in 1431, lived in intimacy with Lorenzo de' Medici and his literary circle. His poem

Il Morgante Maggiore, in which he relates the adventures and exploits of Rinaldo and the giant Morgante, while containing both serious and pathetic passages, is on the whole a burlesque on the romantic epics of his predecessor. Part of it was translated by Byron. Pulci died in 1487.

Pulex. See *Flea*.

Pulica'ria, a genus of plants, nat. order Compositæ, sub-order Corymbiferæ. *P. dysenterica* is the common fleabane.

Pulicat, a town of India, in Madras Presidency, on an island dividing the sea from the Pulicat lake, 23 miles north of Madras city, the earliest settlement of the Dutch on the mainland of India, 1609. Pop. 4967. This town gave name to a kind of handkerchiefs called *pullicates* (which see).

Pulley, a small wheel movable about an axle, and having a groove cut in its circumference over which a cord passes. The axle is supported by a kind of case or box called the *block*, which may either be movable or fixed to a firm support. The pulley is one of the six simple machines or mechanical powers, and is used for raising weights. A single pulley serves merely to change the direction of motion, but several of them may be combined in various ways, by which a mechanical advantage or purchase is gained, greater or less, according to their number and the mode of combination. The advantage gained by any combination or system of pulleys is readily computed by comparing the velocity of the weight raised with that of the moving power, according to the principle of virtual velocities. The friction, however, in the pulley is great, particularly when many of them are combined together. A pulley is said to be fixed when the block in which it turns is fixed, and it is said to be movable when the block is movable. In the single fixed pulley (fig. 1) there is no mechanical advantage, the power

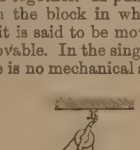


Fig. 1.

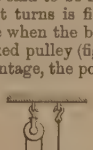


Fig. 2.

and weight being equal. It may be considered as a lever of the first kind with equal arms. In the single movable pulley (fig. 2) where the cords are parallel there is a mechanical advantage, there being an equilibrium when the power is to the weight as 1 to 2. It may be considered as a lever of the second kind, in which the distance of the power

Fig. 3.

Fig. 4.

from the fulcrum is double that of the weight from the fulcrum. In a system of pulleys (figs. 3, 4) in which the same string passes round any number of pulleys, and the parts of it between the pulleys are parallel, there is an equilibrium when the power is to the weight as 1 to the number of strings at the lower block. In a system in which each pulley hangs by a separate cord and the strings are parallel (fig. 5), there is an equilibrium when the power is to the weight as 1 to that power of 2 whose index is the number of movable pulleys (in the case here illustrated $1 : 2^3$ or $1 : 8$). Whatever be the mechanical arrangement of the pulleys and of the ropes the principle of all pulleys is the same, namely, the transmission of the tension of a rope without sensible diminution so as to obviate the loss of force consequent on rigidity. The term pulley is used indifferently to denote either a single sheave or the complete block and its sheaves. In machinery, a pulley is a wheel, generally with a nearly flat face, which being placed upon a shaft transmits power to or from the different parts of the machinery, or changes

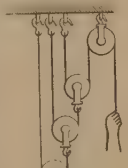


Fig. 5.

the direction of motion by means of a belt or band which runs over it.

Pullicate, a kind of cotton handkerchief formerly made in Scotland in imitation of similar goods made in India, and so called from the town Pulicat (which see).

Pullman-car, a luxuriously fitted up railway carriage, named after its American inventor, for the use of which an extra charge is frequently made, and which is specially adapted for sleeping in, or as a drawing-room or dining car. It is of great length, and is mounted on bogie-wheels so as to take sharp curves.

Pulmobranchia'ta, an order of gastropod molluscs (also called by some naturalists Pulmonata), in which the respiratory organ is a cavity formed by the adhesion of the mantle by its margin to the neck of the animal. The greater part of them are terrestrial, among these being the snails and slugs.

Pulmonary Consumption. See *Consumption.*

Pulmona'ta. See *Pulmobranchiata.*

Pulo-Nias, same as Nias (which see).

Pulo Penang. See *Penang.*

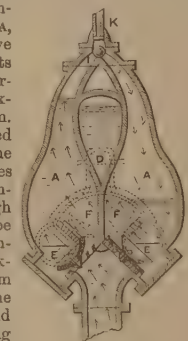
Pulpit, the elevated inclosure or desk in a church from which the preacher delivers his discourse. The *pulpitum* of the ancient Roman theatres was that part of the stage where the actors performed.

Pulque (pul'kā), or OCTLI, a favourite drink in Mexico and Central America, made from the juice of various species of agave, pleasant and harmless until after protracted fermentation, when it becomes an intoxicant. A kind of brandy is also distilled from it.

Pulse, leguminous plants or their seeds, including all kinds of beans, peas, lentils, &c. The considerable proportion of nitrogen which they contain makes them very nutritious, and on that account they are much eaten, with or without rice, in India, where the chick-pea (*Cicer arietinum*) is one of these very largely used. The Hebrew word translated pulse in the authorized version of the Bible, Daniel i. 12, 16, probably means edible seeds in general.

Pulse, the throbbing movement of the walls of blood-vessels, from the passing waves of blood due to the beats of the heart. It is limited in healthy conditions to the arteries. In the newly-born child the healthy pulse registers 130 to 140 beats a minute; at two years of age 105, at ten years about 90, at fifteen to twenty about 70; while in old age it may sink to about 60. In females it is somewhat higher than in males, and during certain fevers it sometimes reaches 140 beats per minute. In arteries which lie immediately under the skin it can be felt with the finger, as is the case with the radial artery, the pulsation of which is very perceptible at the wrist. The state of the pulse is therefore an indication of the force and frequency of the action of the heart, and of the fulness of the vessels.

Pulsom'eter, an instrument of the pump kind for raising water, especially when that liquid is mixed with solid matter. It acts by the condensation of waste steam sent into a reservoir, the water rushing up into the vacuum formed by the condensation. From the accompanying figure it will be seen that it consists essentially of a double chamber, or two connected chambers, A A, having a ball-valve I at top (which shuts either chamber alternately) and clack-valves E E at bottom. Steam is admitted at K to one of the chambers and presses out the water contained there through F to the pipe D to be carried away. Condensation then taking place a vacuum is formed, and the ball falls over and closes the opening through which the steam entered, and water flows up through the clack-valves and again fills the chamber. The steam in the meantime is now acting upon the water in the adjoining chamber, condensation then taking place there, the ball falls back to that side, and the operations go on alternately, the result being a steady stream of water sucked into one chamber after another, and then forced out and upwards by the steam.



Pulsometer.

Pulta'wa. See *Poltava.*

Pul'teney, WILLIAM, English politician, was born in 1684, of an old Leicestershire family; died 1764. He entered the House of Commons in 1705, and became a privy-councillor and secretary at war at the accession of George I., being then a friend and partisan of Walpole. After Walpole became first lord of the treasury in 1721,

Pulteney considered himself slighted, and showing his resentment in the House of Commons, was dismissed by his old ally from his lucrative sinecure, the cofferership of the household. Pulteney now became the strenuous and eloquent leader of an opposition to Walpole, and co-operated with Bolingbroke in the production of the anti-ministerial Craftsman. When Walpole was at last driven from office in 1742, Pulteney was intrusted with the formation of a new ministry, but the composition of it so disappointed the public hopes that he lost his popularity, especially on his acceptance of a peerage, the Earldom of Bath. In 1746 he became the head of a ministry which lasted only two days. He was little heard of afterwards in public life.

Pultusk', a town of Russian Poland, on the river Narew, 32 miles N.N.E. of Warsaw. The Saxons were here defeated by Charles XII. in 1703, and the Russians had to retreat before the French in 1806. Pop. 7619.

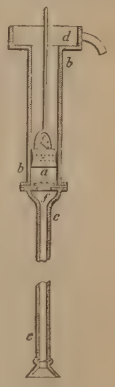
Pulu, a silky fibrous substance obtained from ferns of the genus *Cibotium*, and exported from the Sandwich Islands; used for stuffing mattresses, &c. Other species growing in the East Indies, Mexico, &c., yield a similar substance.

Pulza-oil, the oil yielded by the physic-nut (which see).

Puma. See *Cougar*.

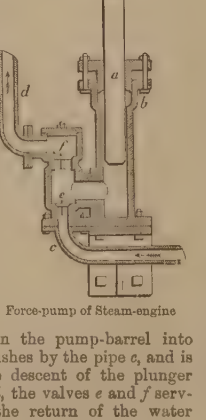
Pu'mice, a substance frequently ejected from volcanoes, of various colours, gray, white, reddish-brown or black; hard, rough, and porous; specifically lighter than water, and resembling the slag produced in an iron furnace. Pumice is really a loose, spongy, froth-like lava. It contains 75 parts silica and 17 alumina, with some iron, lime, soda, &c., and the pores being generally in parallel rows, it seems to have a fibrous structure. Pumice is of three kinds, glassy, common, and porphyritic. It is used for polishing ivory, wood, marble, metals, glass, &c.; also for smoothing the surfaces of skins and parchment.

Pump, a contrivance for raising liquids or for removing gases from vessels. The air-pump is dealt with in a separate article. Though the forms under which the hydraulic pump is constructed, and the mode in which the power is applied, may be modified in a great variety of ways, there are only four which can be considered as differing from each other in principle. These are the *sucking* or *suction pump*, the *lift-pump*, the *force-pump*, and the *rotary* or *centrifugal pump*. Of these the suction or common household pump is most in use, and for ordinary purposes the most convenient. The usual form and construction of this pump are shown in the annexed engraving. A piston *a* is fitted to work air-tight within a hollow cylinder or barrel *b b*; it is moved up and down by a handle connected with the piston-rod, and is provided with a valve *e* opening upwards. At the bottom of the barrel is another valve *f*, also opening upwards, and which covers the orifice of a tube *c c*, called the suction-tube, fixed to the bottom of the barrel, and reaching to the bottom of the well from which the water is to be raised. When the piston is drawn up from the bottom of the barrel the air below is rarefied, and the pressure of the external air acting on the surface of the water in the well, causes the water to rise in the suction-tube until the equilibrium is restored. After a few strokes the water will get into the barrel, the air below the piston having escaped through the piston-valve *e*. By continuing, the water will get above the piston and be raised along with it to the cistern *d*, at the top of the barrel, where it is discharged by a spout. The *lift-pump* has also two valves and a piston, both opening upwards; but the valve in the cylinder instead of being placed at the bottom of the cylinder is placed in the body of it, and at the height where the water is intended to be delivered. The bottom of the pump is thrust into the well a considerable way, and the piston being supposed to be at the bottom, as its valve opens upwards there will be no obstruction to the water rising in the cylinder to its height in the well. When the piston is drawn up its valve will shut, and the water in the cylinder will be lifted up; the valve in the barrel will be opened, and the water will pass through it and cannot return as the valve opens upwards;—another stroke of the piston repeats the same process, and in this way the water is raised from the well: but the height to which it may be raised is not



Suction-pump.

in this as in the suction-pump limited to 32 or 33 feet. The *force-pump* differs from both of these in having its piston solid, or without a valve, and also in having a side pipe with a valve opening outwards, through which the water is forced to any height required, or against any pressure that may oppose it. In such pumps the *plunger* or solid piston is frequently employed instead of the ordinary piston; this arrangement is represented in the accompanying figure, which shows a section of the feed-pump of a steam-engine. The plunger *a* works air-tight through a stuffing-box *b* at the top of the barrel, and on being raised produces a vacuum in the pump-barrel into which the water rushes by the pipe *c*, and is discharged, on the descent of the plunger through the pipe *d*, the valves *e* and *f* serving to intercept the return of the water at each stroke. The side pipe *d*, however, requires the addition of an air-vessel. 'Double-acting' pumps are often employed for household purposes. (See *Fire-engine.*) Centrifugal pumps are universally employed wherever the lift is not too great, and the quantity of water is considerable. A wheel, shaped like an ordinary fan, has passages leading from its centre to its circumference; it is made to rotate very rapidly in a casing. Its circumference communicates with a delivery pipe, and its centre with a pipe leading to the water which is to be pumped. The rapid revolution of the wheel causes by centrifugal action a constant flow of water from centre to circumference of the wheel; and in this way the water is sucked up to the centre of the wheel, and leaves the circumference by the eduction pipe. See also *Chain-pump.*



Force-pump of Steam-engine

Pumpernickel, a coarse brown bread made in Westphalia from unbolted rye.

Pumpkin, a climbing plant and its fruit, of the genus *Cucurbita*, the *C. Pepo*, nat. order Cucurbitaceæ or Gourds. The pumpkin is originally from India, but is at present cultivated in most parts of Europe, and in America. The fruit is red, and sometimes acquires a diameter of 2 feet. There are two varieties of the plant, one with roundish, the other with oblong fruit. The fruit is eaten in a cooked state.

Pumpkin (*Cucurbita Pepo*)

Pun, a play upon words, the wit of which depends on a resemblance in sound between two words of different and perhaps contrary meanings, or on the use of the same word in different senses, &c.

Punch, or The London Charivari, an illustrated weekly comic paper published in London, the first attempt in English comic journalism which achieved success. It issued its initial number July 17, 1841, under the editorship of Mark Lemon, assisted by Henry Mayhew; and Thackeray, Jerrold, Gilbert à Becket, Hood, &c., were among its earlier contributors. Richard Doyle and John Leech were the chief of its earlier illustrators; the chief artists latterly on its staff including Sir John Tenniel, G. du Maurier, C. Keene, Linley Sambourne, E. T. Reed, &c. After Mark Lemon's death Punch was edited by Shirley Brooks and Tom Taylor successively. Its present editor is Mr. F. C. Burnand

Punch (contracted from *punchinello*), the chief character in a popular comic exhibition performed by puppets, who strangles his child, beats to death Judy his wife, belabours a police-officer, &c. The puppet-show of Punch seems to have been first popular in England during the reign of Queen Anne. The hero was sometimes called Punchinello, a semi-anglicized form of the Neapolitan Pulcinello. See *Punchinello.*

Punch, a beverage introduced into England from India, where it received its name from the Hindu word *panch*, five, this being the number of its ingredients, arrack, tea, sugar, water, and lime-juice. In a common brew of the beverage its ingredients are rum, brandy, sugar, boiling-water, and lemon-juice.

Punch, a tool worked by pressure or percussion, employed for making apertures, in cutting out shapes from sheets or plates of various materials, in impressing dies, &c. Punches are usually made of steel, and are variously shaped at one end for different uses. They are solid for stamping dies, &c., or for perforating holes in metallic plates, and hollow and sharp-edged for cutting out blanks, as for buttons, steel-pens, jewelry, and the like.

Puncheon, a liquid measure of capacity containing from 84 to 120 gallons.

Punchinello, a popular Neapolitan exhibition, the origin of the English Punch, said to be derived from a humorous peasant from Sorento, who had received the nickname (about the middle of the 17th century) from his bringing chickens (*pulcinelle*) to market in Naples, and who, after his death, was personated in the puppet-shows of the San Carlino theatre, for the amusement of the people, to whom he was well known. According to another account, it is a corruption of Puccio d'Aniello, a favourite buffoon of the Neapolitan populace.

Punctuation, the art of employing signs by which the parts of a writing or discourse are connected or separated as the sense requires, and the elevation, depression, or suspension of the voice indicated. Punctuation serves both to render the meaning intelligible, and to aid the oral delivery. Our present system of punctuation came very gradually into use after the invention of printing, the Venetian printers, the Manutii contributing materially to its development. The principal points used in English composition are the *comma* (,), *semicolon* (;), *colon* (:), *period* or *full stop* (.), *note of interrogation* (?), *note of exclamation* or *admiration* (!), *dash* (—), and *parenthesis* ( ). The *comma* marks the smallest grammatical division in a sentence, separating the several members of a series, and the subordinate clauses from the main clause. The *semicolon* indicates a longer pause than the comma, but requires another member or members to complete the sense. The *colon* denotes a still longer pause, and may be inserted when a member of a sentence is complete in itself, but is followed by some additional illustration of the subject. The *period* indicates the end of a sentence, and is also used after contracted words, headings, titles of books, &c., and generally after Roman numerals. The *note of interrogation* is placed at the end of a direct interrogatory sentence. The *note of exclamation* or *admiration* is placed at the end of such words or clauses as indicate surprise or other emotion. The *dash* is employed where a sentence breaks off abruptly, and the subject is changed; where the sense is suspended, and is continued after a short interruption; after a series of clauses leading to an important conclusion; and in certain cases to indicate an ellipsis. The *parenthesis* incloses a word or phrase introduced into the body of a sentence, with which it has no grammatical connection.

Pundit. See *Pandit*.

Punic, the language of the ancient Carthaginians, an offshoot of Phœnician, and allied to Hebrew.—*Punic wars*, wars waged between Rome and Carthage, the first B.C. 264–241; the second B.C. 218–202; and the third, which ended with the destruction of Carthage, B.C. 149–147.

Pu'nica, a genus of plants which consists only of a single species, the pomegranate (*P. granātum*). See *Pomegranate*.

Punishment, a penalty inflicted on a person for a crime or offence, by the authority to which the offender is subject; a penalty imposed in the enforcement or application of law. The punishments for criminal offences now known to the English law, are death by hanging, penal servitude, imprisonment with and without hard labour, solitary confinement, detention in a reformatory school, subjection to police-supervision, and putting under recognizance. Penal servitude consists in keeping the offender in confinement and compelling him to labour as directed in several statutes passed in the present reign. There are three kinds of imprisonment: (1) that of a first-class misdemeanant, who is allowed to maintain himself, to procure food, wine, clothing, &c., and to follow his usual occupation, if it does not interfere with the prison regulations; (2) without hard labour, in which case the visiting justices provide for the employment of the prisoner, subject to the condition that no punishment for neglect of work is to be inflicted except by an alteration in the prisoner's diet; (3) with hard labour for not more than ten or less than six hours daily, and as ordered by the justices in sessions with the approval of the home-secretary. In cases 2 and 3 there is a separate confinement of the prisoner. As regards whipping in the case of offenders under sixteen only a birch-rod may be used, and not more than twenty-five strokes be given; in that of offenders above sixteen

not more than fifty strokes, and the sentence must specify their number, and the instrument with which they are to be inflicted. When whipping is ordered on summary conviction before the justices, not more than twelve strokes are to be inflicted on offenders under fourteen, and those with a birch-rod; under the age of ten the number of strokes is restricted to six. Detention in a reformatory school may be ordered for not less than two or more than five years in the case of juveniles who have committed offences punishable with penal servitude, or with imprisonment for at least ten days. In cases of felony and of certain specific misdemeanours, when a previous conviction for a similar offence is proved, the sentence may include police-supervision for seven years or less, to commence at the expiration of the offender's term of imprisonment. On its expiry he must notify to the police within forty-eight hours, his place or any subsequent change of residence, and report himself once a month, a breach of any of these regulations rendering him liable to imprisonment for twelve months with or without hard labour. When the offender is ordered to find recognizances, personal or other, he may, in default, be imprisoned. *Punishments in the army* are inflicted under the Army Act of 1871, Articles of War, and the queen's regulations. A commissioned officer must be tried by court-martial, which may sentence him to death, or cashier him, or place him at the very bottom of the officers of his grade. Privates may for minor offences be ordered short imprisonments, or punishment-drill, or stoppage of leave or pay. For grave offences they are tried by court-martial, and may be sentenced to dismissal from the service, or to imprisonment, to penal servitude, or to death. *Punishments in the navy* are regulated by the Naval Discipline Act of 1866. For officers the chief additions to the punishments inflicted in the army are forfeiture of seniority for a specified time or otherwise, dismissal from the ship to which the offender belongs, and reprimand more or less severe. For men the punishments in the case of grave offences are of the same character as in the army, flogging being practically abolished. For less serious offences there is a system of summary punishments, including short terms of imprisonment which can be awarded by captains of ships under the regulations issued from time to time by the lords of the admiralty.

Punjab, or PANJAB (the name means '*Five Rivers*'), a province of British India, under the administration of a lieutenant-governor, so called because it was the region intersected by the five tributaries of the Indus, the Sutlej, the Beas, the Ravi, the Chenab, and the Jhelum. The present lieutenant-governorship of the Punjab, however, is larger than the Punjab proper, and is bounded on the west by Afghanistan and Beluchistan; on the north by Kashmir; on the east by the North-west Provinces; and on the south by Sind and Rajputana. The area, exclusive of the connected native states, is 110,667 square miles; the pop., according to the census of 1891, 20,866,847; inclusive of native states, the area is 145,198 square miles, and the pop. 25,130,127. It consists of thirty-one British districts and thirty-four native tributary states. For administrative purposes it is divided into the six commissionerships of Delhi, Jalandhar, Lahore, Rawal Pindi, Derajat, and Peshawar. Lahore, situated near the centre of the province, is the capital of the Punjab, but its principal city is Delhi, the ancient metropolis of the Mogul sovereigns of India. The extreme northern portion of the Punjab is rendered mountainous by spurs, or offsets of the great Himalaya system; but for the most part the province consists of a series of extensive plains. These are divided into eastern and western, which may be roughly defined as lying east and west of the meridian of Lahore. The eastern plains include the most fertile and populous portion of the Punjab, with the three great cities of Delhi, Amritsar, and Lahore. Their population is largely urban; trade and manufactures flourish, and the cultivable area is generally under the plough, with the exception of the south-western portions, where flocks and herds pasture in extensive jungles. The western plains, on the contrary, and with the exception of a comparatively narrow zone which is fertilized by irrigation, and which produces some of the finest wheat in the world, are covered by stunted bush, with short grass in dry seasons, and by saline plants which afford nourishment to great herds of camels. These, with cattle, sheep, and goats, are tended by a nomad population. The difference between the inhabitants of these two series of plains is also very marked, those in the eastern partaking of the character of the Hindu inhabitants of India, while those in the western resemble more the Mussulman peoples of the trans-

Suleiman country. According to the census of 1891, in the British districts of the Punjab, the Mahomedans number 55·8 per cent, the Hindus 32·4 per cent, the Sikhs 6·6 per cent of the inhabitants. Though numerically small, the Sikh element in the population is very important. The Sikhs constituted the dominant class when the Punjab became British, and they still compose the mass of the gentry between the five rivers. Since the mutiny the Punjab has made great progress in commerce and general industry, partly through the construction, under British rule, of irrigation-canals and railways. One of the most important products of the Punjab is rock-salt. In addition to the manufactures common to the rest of India the industries of the Punjab include such special products as the silks of Multan and the shawls and carpets of Lahore. The province enjoys an extensive trade with adjacent countries, and sends its products to Delhi by railway, and by the Indus and the Indus Valley Railway to Sind and the sea. Its imports from Britain are chiefly piece-goods, cutlery, and other metal works. The Punjab has had a rather eventful history from the time of Alexander the Great downward. After being long held by rulers of Afghan or Tartar origin, the Sikhs under Runjit Singh established themselves here early in the present century. Latterly the country fell into a very distracted state; its Sikh rulers came into warlike contact with the British, and after the second Sikh war, in 1849, the country was brought under British administration.

Punjnud, the name given to the stream which pours into the Indus, about 70 miles above the Sind frontier, the combined waters of the five rivers, the Sutlej, the Beas, the Ravi, the Chenab, and the Jhelum.

Punkah, in its original sense a portable fan made from the leaf of the palmyra, but in Anglo-Indian parlance a large fixed and swinging fan formed of cloth attached to a rectangular frame suspended from the ceiling and pulled backwards and forwards by means of a cord, thus causing a current of air in the apartment.

Punnah, native state of India, in Bundelcund, by the British agency of which it is politically superintended, formerly very prosperous from the yield of its diamond mines. Estimated area, 2568 sq. miles; pop. 239,333.—PUNNAH is the chief town. Pop. 14,676.

Punniar, town in Gwalior state in Central India, where a British detachment defeated and routed a Mahratta force 12,000 strong on the 29th December, 1843.

Puno, a town of Peru, connected by rail with the Pacific, capital of dep. Puno, on the west shore of Lake Titicaca, 12,430 feet above sea-level. Pop. about 6000.—The department is distinguished by the extent and richness of its pastures, and was formerly famous for its silver mines. Its principal exports are the wool of the sheep, llama, alpaca, and vicuña. Area, 39,743 sq. miles; pop. 256,594.

Punt, an oblong flat-bottomed boat used for fishing and shooting in shallow waters. The most common mode of propulsion is by pushing with a pole against the bottom of the river, &c., a process which is hence called punting.

Punta Are'nas, a convict station and capital of the Chilian colonial territory of Magellan, a free port at which most steamers passing through Magellan Strait call, there being coal in its vicinity. Pop. 1800.

Punta Are'nas, the principal port of Costa Rica, Central America, on the Pacific Coast, Gulf of Nicoya. Pop. 3000.

Pupa, same as *Chrysalis* (which see).

Pupil. See *Eye.*

Pupilarity. See *Age.*

Pupil-teacher, a boy or a girl, not younger than fourteen, engaged by the managers of a public elementary school to teach other pupils, under the superintendence of the principal teacher, during school hours, and out of school hours receiving instruction. Before being engaged the candidate must produce certificates as to character, health, &c., and pass an examination. The normal engagement of a pupil-teacher is for four years, but it may be shortened to three or two, according to age and proficiency. There is an annual examination of the pupil-teacher, which each year is more difficult, while at the same time the range of teaching, is extended. At the end of the engagement the pupil-teacher may become a candidate for admission to a training college, or, if passing a satisfactory examination, may be recognized as an assistant-teacher in a public elementary school. In Scotland, in certain cases, a stipendiary monitor, not under twelve, may, on the recommendation of the inspector, be substituted for a pupil-teacher.

Puppets and Puppet-shows, the performances of images of the human figure moved by fingers, cords, or wires, with or without

dialogue. Puppets in English, French *marionettes*, Italian *fantoccini*, are of great antiquity. In early times in England puppet-shows were called *motions*, and generally represented some scriptural subject. In later times they have ranged from Punch and Judy to representations of shipwrecks and battles. During recent years a higher than the street public have patronized elaborate performances by puppets, chiefly Italian.

Pura'nas. See *Sanskrit.*

Purandhar', a town of India in Poona district, Bombay, 20 miles south-east of Poona city, once a fortress, and now a sanitarium for European troops.

Pur'beck, Isle of, south of Dorsetshire, a peninsula so separated from the mainland on the north by Poole harbour and the Frome as to be connected with it by only a very narrow isthmus. It is about 12 miles long by 7 miles broad. The prevailing rock is limestone.

Purbeck Beds, the uppermost members of the Oolite proper, or according to other writers the basis of the Wealden formation; deriving their name from the peninsula of Purbeck, where they are typically displayed. They consist of argillaceous and calcareous shales, and fresh-water limestones and marbles, and are altogether 300 feet thick. They are noted for their layers of fossil vegetable earth (dirt-beds), inclosing roots, trunks, and branches of cycads and conifers.

Purbeck Marble, Purbeck Stone, an impure fresh-water limestone obtained from the Purbeck beds. It takes on a good polish, but is deficient in durability under exposure to the air, and has hence lost much of its favour as a building-stone. It is much used for slender shafts in the interior of Gothic buildings, for which purpose it answers well.

Pur'cell, Henry, English musical composer, born in 1658, was the son of a musician of the chapel-royal. When quite young he was admitted a chorister of the chapel-royal, where he studied music under Dr. Blow among other teachers, and in 1679 he became organist of Westminster Abbey, and in 1682 of the chapel-royal, holding both appointments conjointly. In 1680, probably, he composed for a private seminary Dido and Eneas, which has been called the first genuine English opera, but has never been produced on the public stage. For some years after he became organist of Westminster Abbey he composed mainly anthems and sacred music, all of great excellence. In 1690 he wrote the music for Dryden's version of The Tempest. In 1691 he produced the music to Dryden's King Arthur, which, though considered his dramatic master-piece, was not published until 1843. In 1694 he wrote, for St. Cecilia's Day, his great works The Jubilate and Te Deum, and in 1695 the music to Bonduca, in which was 'Britons, Strike Home.' He died 1695, and was buried in Westminster Abbey. Purcell was equally great in church music, chamber music, and music for the theatre.

Purchas, Samuel, was born in 1577, at Thaxted, in Essex, and educated at Cambridge. He took orders and became in 1604 rector of Eastwood in Essex, the duties of which office he left for some years to be discharged by a brother, while he devoted himself in London to the self-imposed task of collecting geographical, historical, and miscellaneous information. In 1613 he issued Purchas his Pilgrimage, or Relations of the World and the Religions observed in all Ages and Places discovered from the Creation unto the Present, &c. In 1615 he was appointed rector of St. Martin's, Ludgate Hill, London, a position favourable to the pursuit of his multifarious researches. The MS. remains of Hakluyt having come into his hands he gave to his next work, published in 1624, the title Hakluytus Posthumus, or Purchas his Pilgrims, containing a History of the World in Sea Voyages and Lande Travells by Englishmen and others, which is valuable as containing the narratives of voyagers, explorers, and adventurers as written by themselves, the language of the previous work, the Pilgrimage, on the other hand being Purchas's own. The Pilgrims have been much utilized by subsequent compilers of voyages and travels. Purchas died in London in 1626

Purchase, in law, is the act of obtaining or acquiring the title to lands and tenements by money, deed, gift, or any means except by descent. *To be worth so many years' purchase* is said of property that would bring in, in the specified time, an amount equal to the sum paid. Thus to buy an estate at *twenty years' purchase* is to buy it for a sum equivalent to the total return from it for twenty years.

Purchase, a system, now abolished, by which more than half the first appointments and much of the subsequent promotion of officers in the British army used to be effected. The prices of commissions were

fixed as follows:—£450 for a cornetcy or ensigncy; £700 for a lieutenancy; £1800 for a captaincy; £3200 for a majority; and £4500 for a lieutenant-colonelcy, which was the highest rank that could be obtained by purchase. In theory an officer wishing to retire from the service might sell his commission for the price affixed to the rank he occupied. When a superior officer 'sold out' the next officer inferior to him might purchase promotion to the rank of the former by merely paying the difference between the prices of their respective commissions. The rank of the second might be reached in the same manner by his next inferior, an so on down to the ensign or cornet. No commission could be purchased by one officer unless another officer vacated his commission by its sale. The abolition of the purchase system took place in 1871, but the officers who were deprived of a saleable interest in their commissions were compensated by giving them a sum of money, the payment of which was to be extended over twenty-five years, and which, it was estimated, would amount to £8,000,000. Promotion has since been through seniority, tempered by selection. The Regimental Exchange Act of 1875 permitted the exchange of commissions through purchase under such conditions as the crown might deem expedient for the time being.

Pur'gatives are medicines used for the purpose of producing the evacuation of the bowels. The following is a common classification of them:—(1.) *Laxatives* or *Mild Cathartics*, employed when the least possible irritation is desired, such as manna, sulphur, cassia, castor-oil, tamarinds, prunes, honey, ripe fruit. (2.) *Saline* or *Cooling Laxatives*, giving rise to more watery evacuations than the first group, such as Epsom salts, Glauber's salt, phosphate of soda, Seidlitz powders, &c. (3.) *Active Cathartics*, occasionally *acrid*, frequently *tonic* and *stomachic*, such as rhubarb, senna (often in the form of black draught), and aloes. (4.) *Drastic* or *Violent Cathartics*, such as jalap, scammony, gamboge, croton-oil, colocynth, and elaterium, which in large doses act as irritant poisons, and are employed in smaller doses chiefly when the bowels have failed to be moved by milder purgatives. (5.) *Mercurial Purgatives*, such as calomel, blue pill, and gray powder. Of late years podophyllin, a preparation of the resin of the May-apple, has come much into vogue as a substitute for mercury in its various forms. All the members of this group are usually combined with or followed by other purgatives, blue pill, for instance, being followed by black draught, and podophyllin combined with taraxacum.

Pur'gatory, as believed in by the Roman Catholic Church, is an intermediate state after death in which the souls of the righteous expiate, through temporary suffering, sins committed in this life, and not fully atoned for before death. According to the Council of Trent, they are 'assisted by the suffrages of the faithful, but especially by the most acceptable sacrifice of the mass,' to be enabled to enjoy the happiness of heaven. Catholics claim that this belief in purgatory is upheld by the general teaching of Scripture without being specifically declared in any particular passage; they also claim that it is in harmony with the faith and practice of the early Christian ages.

Puri. See *Pooree* and *Jagannâtha.*

Purification, the Jewish rite of, was mainly one through the performance of which an Israelite was readmitted to the privileges of religious communion, lost through uncleanness. The chief varieties of such uncleanness, and the methods of purification from it required, are detailed in Lev. xii., xiv., xv., and Numb. xix. The necessity of purification was extended after the captivity to a variety of cases not included in the Mosaic legislation, such as the washing of cups and pots, &c., referred to in Mark vii. 4.

Purification of the Virgin Mary, FEAST OF THE, called also the feast of the Presentation of the Child Jesus, is a festival of the Christian church held on the 2d of February, in commemoration of the event related in Luke's gospel, chap. ii. The festival dates from very early times, and is said to have been formally instituted by Pope Gelasius in A.D. 494. See *Candlemas.*

Purim, a Jewish festival observed on the 14th and 15th of Adar (March), instituted to commemorate the preservation of the Jews in Persia from the destruction threatened them by the schemes of Haman (Esther ix.).

Pu'ritans, a name first applied to those English Protestants who regarded the Reformation in England as incomplete, and the Anglican Church, even of Edward VI., as retaining too much of the discipline, ritual, and ceremonial of the Church of Rome. Many of them, who were driven into exile under Queen Mary, and who

returned to England after the accession of Elizabeth, brought back a zealous desire to remodel the Church of England in the spirit of continental Protestantism, especially that of Geneva. In 1572 a presbytery was set up at Wandsworth in Surrey, and before many years Presbyterianism found adherents both among the clergy and the laity. Meanwhile the Brownists, the Independents of later days, whose Congregationalism was as much opposed to Presbyterianism as to Episcopacy, began to be organized and to make some progress. In doctrine these two Puritan parties differed little from each other, or from many Anglicans who remained contented with the Church of England as it was. During the later years of Elizabeth the nickname of Puritan was popularly bestowed on all in the church, or out of it, whose views of religion led them to adopt a great austerity of life and gravity of demeanour; who made constant use of biblical phraseology in their ordinary conversation, and who treated as sinful the most of the amusements and diversions of the society around them. The drama was specially obnoxious to them, and the dramatists repaid the hatred of the extreme Puritan by ridiculing and caricaturing him on the stage. Though the Puritans were always steadfastly loyal to Elizabeth, the legislation which she favoured visited with severe penalties Protestant nonconformity to the Established Church, and in 1592 several leading Brownists were brought to the scaffold. The hopes with which the accession of James I. inspired the Puritan party in the church were grievously disappointed when their moderate demands for a reform of ritual and a slight modification of episcopal authority were rejected at the Hampton Court Conference. During his reign the prelates and many of the clergy became less Protestant, while the Puritan element in the church, and out of it, increased in intensity. Nonconformity was pursued by new penal statutes, and numbers of Puritans emigrated to New England. This emigration continued during the reign of Charles I. and the ascendency of Laud. The Parliamentarians who took arms against Charles I. were mainly Puritans, and the bulk of them were Presbyterians. Presbyterianism in England reached its height with the meeting of the General Assembly of Divines at Westminster. (See *Presbyterians*.) With the downfall of the Anglican system Independency again reared its head in England. The Independents now combined with their congregationalism the desire for a theological latitude, which widened the gulf between them and the Presbyterians. The army became leavened with Independency, and Oliver Cromwell its champion. With his ascendency the influence of Presbyterianism as a power in the state dwindled, and Independency became the dominant element in English Puritanism. After the restoration of Charles II. and of the old Anglicanism, the Presbyterians, Independents, and Baptists were the three chief denominations into which Puritanism had split up. Since then Nonconformists or Dissenters has been the term generally used where Puritanism would formerly have been employed.

Purl is the name now given to hot beer flavoured with gin, sugar, and ginger.

Pur'niah, the north-eastern district of the Bhágalpur division of the lieutenant-governorship of Bengal. Rice and indigo are its chief products. Area, 4956 sq. miles; pop. 1,944,658.—PURNIAH, the chief town, stands on the east bank of the Saurá river. It is an unhealthy place, but does a considerable trade in jute. Pop. 14,600.

Purple, a secondary colour compounded by the union of the primaries *blue* and *red*. Of all the various kinds in use, the Tyrian dye was anciently the most celebrated. This colour was produced from an animal juice found in a shell-fish called *murex* by the ancients; and as it was thus obtained only in small quantities, its use was restricted to the great and wealthy. It became the distinctive colour of imperialism, and the later emperors of the East forbade its use by subjects. Hence their offspring were called *purphyrogeniti*, born in the purple. In modern times, and from the red or scarlet hat, cassock, and stockings worn by them, cardinals are sometimes said to have obtained the purple. With the general disuse of the purple obtained from shell-fish, archil and cudbear, yielded by various species of lichens, were employed in the dyeing of silk and wool; but they have been superseded by the purples obtained from aniline. For cotton the chief purple dye was furnished by madder, but the alizarin to which madder owed its dyeing properties is now prepared from coal-tar. The common shades of purple with which wool is dyed are obtained from logwood with a mordant of alum and tartar.

Purple-black, a preparation of madder used as a pigment.

Purple-emperor, the *Apatura* or *Nymphalis Iris*, a large, somewhat rare, and richly-coloured British butterfly: so called from the splendid purple iridescent colour of its fore wings.

Purple Grackle. See *Crow-blackbird.*

Purple Heron (*Ardĕa purpurĕa*), an occasional visitor to Britain, of which the occipital plumes are glossy black tinged with purple.

Purple of Cassius. See *Cassius, Purple of.*

Purples, Ear Cockle, or Peppercorn, a disease affecting the ears of wheat, produced by the *Tylenchus* or *Vibrio tritici* ('wheat eel'), one of the Infusoria. The infected grains of wheat at first assume a dark-green colour, which soon deepens to a black, and become rounded like small peppercorns. The husks open, and the diseased grains are found to contain no flour, but a moist substance of white colour and of cottony consistence. A single grain of wheat may contain 50,000 young vibrios. These forms may be dried, and restored again on the application of moisture. Dilute sulphuric acid, in the proportion of 1 of acid to 100 parts of water, destroys the vibrio effectually.

Purples, The, or Purpura, spots of a livid red on the body, the result of extravasation of blood from the skin. In ordinary purpura, which is not dangerous, tonics, especially quinine and iron, are the most effective remedies. In the *purpura hæmorrhagica*, or bleeding purpura, there is hæmorrhage from mucous membranes, sometimes terminating fatally. In this form of the disease with copious bleeding, benefit may be derived from the use of ergot, given either by the mouth or hypodermically, as a solution of ergotine.

Purple-wood, the heart-wood of *Copaifĕra pubiflŏra* and *C. bracteāta*, imported from the Brazils, well adapted for mortar-beds and gun-carriages, and also used for ramrods, buhl-work, marquetry, and turnery.

Pur'pura, a genus of gasteropod molluscs, of which the greater number are littoral. Many of these molluscs secrete a fluid which is of a purplish colour, but one in particular furnished that celebrated and costly dye of antiquity called the Tyrian purple.

Pur'pura. See *Purples.*

Purqueira Oil, same as *Pulza Oil.*

Purse, in Turkey the sum of 500 piastres, or £4, 10*s.*; in Persia, 50 tomans, or £23, 4*s.* 7*d.*; in Egypt, 500 tariff piastres, or £5, 2*s.* 6½*d.*

Purse-crab, a name for decapod crustaceans of the genus *Birgus*, allied to the hermit-crabs. A species, *B. latro* (the robber-crab), found in the Mauritius and the more eastern islands of the Indian Ocean, is one of the largest crustaceans, being sometimes 2 to 3 feet in length. It resides on land, while paying a nightly visit to the sea, often burrowing under the roots of trees, lining its hole with the fibres of the cocoa-nut husk and living on the nuts, which (according to some writers) it climbs the trees to procure, and the shells of which it certainly breaks with great ingenuity.

Purser, in the navy, the officer who kept the accounts of the ship to which he belonged, and had charge of the provisions, clothing, pay, &c. Since 1844 superseded by an officer called a *paymaster.*

Pur'slane, a plant of the genus *Portulăca* (*P. oleracea*), with fleshy succulent leaves, naturalized throughout the warmer parts of the world. Purslane was formerly more used than at present, at least in Britain, in salads, as a pot-herb, in pickles, and for garnishing.

Pur'suivant, an attendant on the heralds, one of the third and lowest order of heraldic officers. There are four pursuivants belonging to the English College of Arms, *Rouge Croix, Blue Mantle, Rouge Dragon*, and *Portcullis.* In the court of the Lyon King-of-Arms in Scotland there were formerly six pursuivants, *Unicorn, Carrick, Bute, Kintyre, Ormond*, and *Dingwall*, but the last three have been abolished.

Puru, or Purus, a river of South America, which rising in the east of Peru enters Brazil, and flowing north-east after a course of 1800 miles joins the Amazon about 100 miles above the confluence of the Madeira with the latter.

Purvey'ance, formerly in England the exercise by officials called *purveyors* of the royal prerogative, involving a right of preemption, by which the king was authorized to buy provisions and necessaries for the use of his household at an appraised value, in preference to all his subjects, and even without the consent of the owner; it included the right of impressing horses and carriages, &c., for the use of the sovereign. It was also practised by many of the great English nobles. It led to much oppression and many exactions, and a number of statutes were passed to prevent them.

Purvey'ors, Army, were officers charged with superintending the civil affairs of army

hospitals, such as the payment of men, procuring provisions, medical comforts, bedding, &c. In 1870 the purveyor's department was merged into the then newly-formed control department, which afterwards became that of the commissariat and transport staff, and this has lately been transformed into the army service corps.

Purwa', a town of India, Unao district, Oude, with manufactures of shoes and leather-work. Pop. 9719.

Pus, the white or yellowish matter found in abscesses, and formed upon the surfaces of what are termed healthy sores.

Pu'sey, EDWARD BOUVERIE, D.D., after whom the Tractarian movement in the Church of England became designated Puseyism, was born in 1800. His father, the Hon. Philip Bouverie, half-brother of the first Earl of Radnor, assumed the name of

Rev. Dr. Pusey.

Pusey on inheriting the Pusey estates in Berkshire. He was educated at Eton and Christ Church, Oxford, and became fellow of Oriel in 1824. In 1828 he was appointed to the regius professorship of Hebrew at Oxford, to which was attached a canonry of Christ Church. In 1833 the Tracts for the Times began to appear, but he was not prominently connected with the Tractarian movement until 1835–36, when he contributed to the Tracts one on baptism, which excited much attention. He published a defence of the famous Tract No. 90, and in 1843 he was suspended by the vice-chancellor of Oxford from preaching for three years, on account of the very high sacramental doctrine inculcated in his sermon on the Eucharist, preached before the university. The prominence thus given to him, his position in the university, his reputation for scholarship, and his thorough-going advocacy of 'Anglo-Catholic' principles, procured the general adoption of the term Puseyism as a synonym of Tractarianism; and with the secession of Newman to Rome, Pusey became the acknowledged head of the new church party. During the rest of his life he lived very retired, though a continual flow of books, pamphlets, &c., came from his pen. He died in 1882. Among the more substantial of his works, in addition to his Library of English Fathers and Anglo-Catholic Library, are his Councils of the Church, from the Council of Jerusalem, A.D. 51, to the Council of Constantinople, A.D. 381 (1857); Daniel the Prophet, nine lectures (1864); and the Minor Prophets, with a commentary and introduction to the several books (1860–77).

Puseyism. See *Tractarianism.*

Pushkar, town of India, in Ajmere-Merwára, Rajputána, the only one in India containing a temple dedicated to Brahma. A great fair in October and November is attended by about 100,000 pilgrims. Pop. 5000.

Pushkin, ALEXANDER SERGÉYEVITCH, a famous Russian poet, born at St. Petersburg 1799, died 1837. At an early age, on account of his liberal opinions, he was sent to Odessa, where he discharged various offices, but was restored to favour on the accession of Nicholas in 1825, who appointed him imperial historiographer. He made a study of foreign literatures, and was much influenced by Byron. His first poem was Ruslan and Liudmila (1821); this was followed by the Prisoner of the Caucasus; the Fountain of Bakhtchisarai; Eugene Onegin; the Gypsies; and Poltava. He was also the author of a dramatic poem Boris Godoonof. He fell in a duel with his brother-in-law. His works have been translated into German, French, and English.

Pushtu (of which PUKHTU is a dialectic variation) is the vernacular language of the Afghans proper wherever they may be settled, and by the best authorities is regarded as an Aryan language, more or less allied to the Iranian group. Persian is the language of the educated classes in Afghanistan, and is also known to the people, who, however, prefer the use of Pushtu.

Pustule, a small and nearly rounded elevation of the cuticle, with an inflamed base,

and containing pus. Diseases known as 'pustular diseases' are those that are characterized by true pustules. Small-pox and chicken-pox are accompanied by pustules, but these are regarded as febrile, not pustular diseases, the eruption being not primary but secondary.

Putchock, PUCHUCK, the root of *Aplotaxis Lappa*, a composite plant growing on the Himalayas in the vicinity of Cashmere. It is exported to the Malay countries and to China, where it forms a main ingredient in the Chinese pastille-rods known as *joss-sticks*. In Upper India it is given as a medicine in various complaints ranging from coughs to cholera.

Puteaux (pû-tō), a town of France, in the department of the Seine, on the left bank of the Seine, about 7 miles west of Paris. Its industries include the printing of calicoes, dye-works, and works for the construction of machinery. Pop. 15,000.

Pute'oli, the ancient name for Pozzuoli. See POZZUOLI.

Putney, a suburb of London, in the county of Surrey, on the right bank of the Thames opposite Fulham, and within the parliamentary bounds of Wandsworth. The town is about 8 miles above London Bridge by river, and 4½ miles from Hyde Park Corner by road. The headquarters of the rowing world are at Putney. Pop. 17,771.

Putrefaction, such a decomposition of dead organic matter as is generally accompanied by the evolution of fetid gases, now regarded as due to the agency of bacteria or other organisms floating in the atmosphere, which find a nidus in the putrescible matter and grow and multiply in it. The substances in which these animalcules are thus developed are reduced either to much more simple compounds, or to their original separate elements. The putrefaction, or putrefactive fermentation, of animal substances is usually attended by more fetid and noxious exhalations than those arising from vegetable products, chiefly through the more abundant presence of nitrogen in the former. The formation of ammonia, or of ammoniacal compounds, is a characteristic of most cases of animal putrefaction, while other combinations of hydrogen are also formed, especially carburetted hydrogen, together with complicated and often highly infectious vapours or gases, in which sulphur and phosphorus are frequently discerned. These putrefactive effluvia are for the most part easily decomposed or rendered innocuous by the agency of chlorine. The rapidity of putrefaction and the nature of its products are to a great extent influenced by temperature, moisture, and access of air. A temperature between 60° and 80°, a due degree of humidity and free access of air, are the circumstances under which it proceeds most rapidly. Hence the action of the minute organisms which produce putrefaction can be checked or altogether prevented by a very high, or a very low, temperature, by the exclusion of air, and by the absence of moisture. Antiseptics prevent and to some extent arrest the progress of putrefaction.

Puttea'la. See *Patiala*.

Puttenham, GEORGE, an English writer, regarded as the author of The Art of Poesie, which appeared anonymously in 1589. If its author, he was, from indications given in that and another work from the same pen, born about 1530, and became a scholar of Oxford. In 1579 he presented his Partheniades to Queen Elizabeth, to whom he was a gentleman-usher. The Art is a review of ancient as well as modern poetry, and was written for the court and to instruct in versification. Its author wrote several other pieces which have been lost.

Putty, a kind of paste or cement compounded of whiting or soft carbonate of lime and linseed-oil, beaten or kneaded to the consistence of dough. In this state it is used by glaziers for fixing in the squares of glass in window frames, &c., and also by house-painters to stop up holes and cavities in wood-work before painting.

Putty-powder, a pulverized oxide of tin sometimes mixed with oxide of lead. It is extensively used for polishing and other purposes in glass and marble works; the best kinds are used for polishing plate.

Puy (pû-ē), LE, called also LE PUY-EN-VELAY, and LE PUY-NOTRE-DAME, a town of France, chief town of the department of Haute-Loire, 270 miles S.S.E. of Paris. It is built on the steep slope of an isolated craggy hill, and viewed from a distance has a most striking and picturesque appearance. Overtopping the houses is a conical rock crowned by a small chapel and a colossal statue of the Virgin. The cathedral, an ungainly Romanesque building, dates from the 6th to the 12th century. The manufactures are chiefly lace, tulle, and woollens. Pop. 18,567.

Puy-de-Dôme (pû-ē-dė-dōm), a department of Central France; area, 3070 square miles: takes its name from a volcanic cone

(4805 feet) which overlooks it. The highest point in the department, Puy-de-Sancy, 6188 feet, is the most elevated peak of Central France. The department, with its numerous extinct volcanoes and volcanic formations, is geologically very interesting, the volcanic formations giving the scenery a very distinctive character. Of a total area of 1,964,685 acres, much the largest proportion is good arable and pasture land, the fertile plains of Limagne, more than 70 miles in length, consisting of alluvial deposits of volcanic origin, making it one of the richest regions of France. There are coal and other mines in the department, which also contains a number of springs, some of which have been resorted to by health-seekers since the days of the Romans. The industries of the department include paper-making, sugar production, and the manufacture of various textile fabrics. Pop. 570,964.

Puzzola'na. See *Pozzolana* and *Cements.*

Pwllheli (puł-hā'lē), a parliamentary and municipal borough and seaport of Wales, in Carnarvonshire, on Cardigan Bay, 21 miles S.W. of Carnarvon. It is an old town, is surrounded by splendid scenery, is much visited by tourists, and is a favourite watering-place. It belongs to the Carnarvon district of parliamentary boroughs. Pop. 3242.

Pyæmia (pī-ē'mi-a), blood-poisoning, a dangerous disease resulting from the introduction of decaying animal matter, pus, or other morbid product into the system. Such matter may be introduced through an ulcer, wound, an imperfectly closed vein, or a mucous membrane, as that of the nose. This disease was common after severe operations in crowded hospitals, whose atmosphere was loaded with purulent or contaminated matter. It has been much checked of late years by the improved ventilation of hospitals, and by the application of antiseptics in the performance of surgical operations and the dressing of wounds.

Pycnog'onum, a genus of Arachnida, the sea-spiders. Some species are parasitic upon fishes and other marine animals, but the common British species, *P. littorāle,* is free when adult, and does not appear to be parasitic during any period of its existence. *P. Balænārum* attaches itself parasitically to the whale.

Pye, HENRY JAMES, poet laureate, was born in 1745, of an old Berkshire family. In 1784 he entered parliament as M.P. for Bucks. Having in 1775 published a translation of six odes of Pindar, in 1778 one of Frederick the Great's Art of War, and in 1786 another of the Poetics of Aristotle, with a commentary, he was, in 1790, appointed poet laureate. In 1792 he was appointed a Westminster police magistrate. In 1801 appeared his Alfred, an epic. He died in 1813.

Pye, JOHN, English engraver, born 1782, died 1874. Early in the century he gained a high reputation for his engravings of Turner's landscapes, a number of which he executed, beginning with Pope's Villa in 1811. He also engraved works by Claude, Michael Angelo, Gaspar Poussin, Landseer, &c. He passed much of his life in Paris, and was elected a corresponding member of the French Institute.

Pygma'lion, in Greek mythology, a king of Cyprus, who, having made an ivory image of a maiden, fell in love with his own work, and entreated Venus to endow it with life. His prayer was granted, and the maiden became his wife.

Pygmy, one of a race of dwarfs, first mentioned by Homer as dwelling on the shores of Ocean, and having to sustain a war against the cranes every spring. Later writers place them mainly in Africa, Aristotle at the sources of the Nile, and in fact there are dwarfish races in the interior of Africa. See *Akkas.*

Py'lades (-dēz), in Greek mythology, son of Strophius, king of Phocis, and Anaxibia, the sister of Agamemnon, after whose murder by Clytemnestra, their son Orestes, being carried secretly to the court of Strophius, formed the friendship with Pylades which has become proverbial. He assisted Orestes in murdering Clytemnestra, and eventually married his sister Electra.

Pylons, in Egyptian architecture, the name given to towers or masses of masonry, somewhat resembling truncated pyramids, placed one on each side at the entrance of temples, and having a very imposing appearance. Behind them in the larger temples there was often a large open court, and in front there might be an avenue with sphinxes on either side. An entrance of which these pylons form part is sometimes called a *propylon.* See *Egypt* (*Architecture*).

Pylo'rus, the lower and right orifice of the stomach through which the food passes on to the intestine. See *Stomach.*

Pylos, a town of ancient Greece memorable in the Peloponnesian war, and represented by the modern Navarino.

Pym, John, English statesman and leader of the popular party during the reigns of James I. and Charles I., was born in Somersetshire 1584; studied at Oxford and became famous as a lawyer. He entered

John Pym.

parliament in 1614, and during the reign of James he attained great influence by his opposition to the arbitrary measures of the king. He sat for Tavistock in all the parliaments of Charles's reign. In 1626 he took part in the impeachment of Buckingham and was imprisoned. In the short parliament of 1640 Pym and Hampden were exceedingly active as leaders of the popular party, and in 1641 Pym was offered the chancellorship of the exchequer. He impeached Strafford, and at his trial appeared as accuser. He was the main author of the Grand Remonstrance, the final appeal presented in 1641, and one of the five members to arrest whom the king went to the House of Commons in Jan. 1642. When civil war became inevitable Pym was appointed one of the committee of safety, and while he lived was active in resisting the negotiation of any peace with the king which did not secure the liberties of the subject and the supremacy of parliament. It was mainly his financial skill that enabled the parliamentary army to keep the field. In Nov. 1643, he was made lieutenant-general of ordnance, and in the following month he died, and was buried in Westminster Abbey.

Pymma-wood, the wood of the *Lagerstræmia reginæ*. See *Blood-wood*.

Pyr'amid, in geometry, is strictly a solid contained by a plane triangular, square, or polygonal base, and other planes meeting in a point. This point is called the vertex of the pyramid; and the planes which meet in the vertex are called the sides, which are necessarily all triangles, having for their bases the sides of the base of the pyramid. Every pyramid is one-third the solid content of a prism that has the same base and altitude as the pyramid. Pyramids are denominated triangular, square, pentagonal, &c., according as the base is a triangle, a square, a pentagon, &c.

Pyramid, in architecture, a colossal structure of masonry having a rectangular base and four triangular sides terminating in a point, used by the ancients in various parts of the world for sepulchres or for religious purposes, especially in Egypt. The largest and most remarkable of the Egyptian pyramids occur in several groups on the west side of the Nile, on the border of the Libyan desert, extending for a distance of about 25 miles from north to south, the farthest north being opposite Cairo. They are built chiefly of the hard limestone of the adjacent hills, but large blocks of granite brought from a distance are also used, especially on the outside. The four sides are so placed as to face the four cardinal points. These structures are supposed to date from about 3000 B.C. to 2300 B.C. The stones used varied in size, but are mostly large, requiring wonderful mechanical skill to quarry them, transport them, and raise and adjust them in their proper places. An almost fabulous number of labourers were engaged in erecting the chief Egyptian pyramids, of which the group of Gizeh, 4 miles S.W. of Cairo, in the neighbourhood of the ancient Memphis, is the most remarkable. This group consists of nine pyramids, among them the three most celebrated of all, the pyramid of Cheops (Khufu), called the Great Pyramid; of Cephren (Khafra); and of Mycerinus (Menkauru). According to Herodotus the Great Pyramid took 100,000 men working for ten years to make a causeway 3000 feet long in order to facilitate the transport of the stone from the quarries; and the same number of men for twenty years more to complete the pyramid itself. Its base forms a square, each side of which was originally 768 feet, though now, by the removal of the coating, only 750 feet long, occupying 13 acres. The outer surface forms a series of steps, each of the average height of 3 feet or more. When the structure was perfect this step formation was hidden by the coating, which

rendered the sides quite smooth, and the apex, where there is now a space of 12 sq. yards, was no doubt originally quite sharp. The height was originally about 480 feet, but is now only 451. The interior, entered 49 feet above the base of the north face, contains several chambers, one of which, called the King's Chamber, is 34½ feet long, 17 wide, and 19 high, and contains a sarcophagus of red granite. The second pyramid is 690 feet square and 447 feet high. The third pyramid is only 354 feet square and 203 feet high, and is the best constructed of the three. The six smaller pyramids which complete the Gizeh group are of much inferior interest. The pyramids are supposed to have been built by the respective kings as tombs and memorials of themselves; and it is conjectured that they were begun at the beginning of each reign, and that their size corresponded with the length of it. About 350 yards south-west of the Great Pyramid is the celebrated Sphinx. Ruins of pyramids are to be found at Benares in India and in other parts of the East. Certain monuments of the ancient inhabitants, found in Mexico, are also called pyramids. These seem to have been intended to serve as temples, the tops of them being flat and surmounted by a house or chamber in which sacred rites were probably performed. The largest and perhaps the oldest of them is that of Cholula, which is said to have a base of 1770 feet and a height of 177 feet.

Pyramids, in billiards, a game played with fifteen red balls and one white, the red balls being placed together in the form of a triangle or pyramid at spot, the object of the players being to try who will pocket the greatest number of balls.

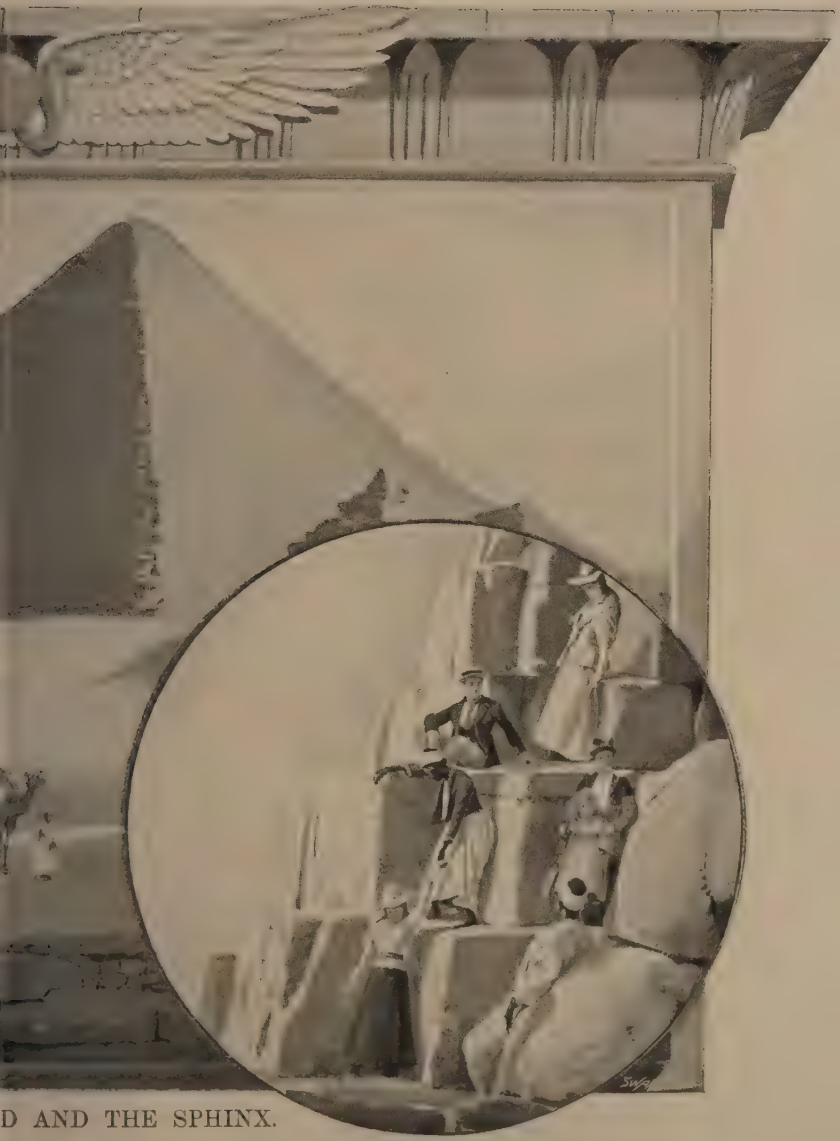
Pyr'amus and This'be, a pair of devoted lovers, who, as their story is told by Ovid (Met. iv. 55–165), resided in Babylon, and being prevented by their parents from meeting openly, were in the habit of secretly conversing through an opening of the wall, as their houses adjoined. They agreed one day to meet at the tomb of Ninus, when Thisbe, who was the first at the rendezvous, was surprised by a lioness and took to flight. In her haste she dropped her garment, which the lioness seizing covered with blood, having immediately before killed an ox. Pyramus appearing on the scene, and concluding from the blood-besmeared robe that Thisbe was dead, killed himself. Thisbe returning soon afterwards, and finding the body of her lover, also killed herself. The story was very popular in the time of Shakespeare, who made it the subject of the burlesque interlude in A Midsummer Night's Dream.

Pyrenees', a lofty mountain range, the crest of the main chain of which forms the boundary between France and Spain. It abuts with one extremity on the Mediterranean, and with the other on the Atlantic. Its length, from Cape Creux on the Gulf of Lyons, to Fontarabia on the Bay of Biscay, is about 280 miles, and its greatest breadth little more than 50 miles. It consists of two lines, which form parallel ridges about 20 miles apart from each other, except near the centre, towards which the range rises both from the east and west. The descent on the south side is much more abrupt than on the north. Its loftiest summits are near its centre, where its culminating point, Maladetta, or Pic de Néthou, reaches a height of 11,424 feet. The principal passes in the Pyrenees, formed by the meeting of valleys from opposite sides of the axis, take in the east part of the chain the name of Cols, and towards the centre that of Ports. Only four of these are conveniently practicable for carriages. In 1885 the French and Spanish governments agreed to the construction of two railways, of which the tunnels perforating the Pyrenees were to be made at the cost of both countries. In the Pyrenees is to be found some of the finest scenery in France. The climate, genial and warm, banishes perpetual snow to 1300 feet higher than the snow-line of the Alps. The French Pyrenees abound in mineral springs, in connection with which are some of the gayest watering-places in Europe, chief among them Bagnères de Luchon. Barège is in a dreary gorge, but its waters are celebrated for their efficacy.

Pyrénées (pē-rā-nā), the French name of the Pyrenees, giving name to three French departments. — **Basses-Pyrénées** (bäs-pē-rā-nā) is a department of South-western France, at the angle of the Bay of Biscay. Its industry is mainly agricultural. The surface is diversified, there is much fine scenery, and the forests are extensive and valuable. Biarritz, its chief watering-place, is well known as a health resort, especially in winter. Pau is the capital of the department. Area, 2943 sq. miles; pop. 432,999. — **Hautes-Pyrénées** (ōt-pē-rā-nā) is a department of Southern France, bounded partly by Spain, partly by Basses-Pyrénées, and other departments. To it in the south

THE GREAT PYRA

The circular compartment gives an idea of the size of th
internal galleries of the



D AND THE SPHINX.

nes composing the pyramid. On the left are shown two of the
mid, with symbolic devices, &c.

belong some of the loftiest summits of the Pyrenees. The fine scenery and the mineral springs of the department attract many visitors. Area, 1749 sq. miles; pop. 234,825. Tarbes is the capital.—PYRÉNÉES-ORIENTALES (pē-rā-nā-zo-rē-aṇ-tāl), a department of Southern France, bordering on the Mediterranean and the Spanish frontier. Its chief wealth lies in its wines, of which the well-known Roussillon is one. The department is also very rich in iron. Perpignan is the capital. Area, 1592 square miles; pop. 211,187.

Pyrenees, PEACE OF THE, concluded between France and Spain by Cardinal Mazarin and De Haro, on the Ile des Faisans, in the river Bidassoa, on the borders of the two countries, 7th November, 1659, terminated a war which had lasted for twenty-four years. By this treaty Spain ceded to France Roussillon, with the fortress of Perpignan, &c., so that the Pyrenees have since formed the boundary of the two kingdoms; and in the Netherlands, Artois, and part of Flanders, Hainault, and Luxemburg, with a number of fortified towns.

Pyreth'rum, a genus of herbaceous plants nearly allied to *Chrysanthemum*. *P. Parthenium* is known as feverfew; from *P. roseum* is made the well-known Persian insect-powder.

Pyrgos, a town of Greece, near the west coast of the Morea, and not far from the mouth of the Ruphia (Alpheios). Its harbour is at Katakolo, with which and with Athens there is railway communication, and it carries on a large trade. Pop. 12,647.

Pyrhe'liometer, an instrument devised by M. Pouillet for measuring the intensity of the heat of the sun. It consists of a shallow cylindrical vessel of thin silver or copper, containing water or mercury in which a thermometer is plunged. The upper surface of the vessel is covered with lamp-black, so as to make it absorb as much heat as possible, and the vessel is attached to a support in such a way that the upper surface can be always made to receive the rays of the sun perpendicularly. The actual amount of heat absorbed by the instrument is calculated by ordinary calorimetrical means. The area of the exposed blackened surface and the amount of water or mercury which has been raised through a certain number of thermometric degrees being both of them known, the absolute heating effect of the sun, acting upon a given area under the conditions of the experiment, can be readily found.

Pyrites (pi-rī'tēz), a name given in mineralogy to various metallic sulphides, chiefly to the sulphides of copper and iron. Pyrites is largely used as a source of sulphur in the manufacture of sulphuric acid. For iron pyrites see *Iron*.

Pyritz, an ancient town of Prussia, 24 miles south-east of Stettin. Its chief industries are machinery, sugar manufacture, and agriculture. Pop. 8062.

Pyrmont, a watering-place of Prussia, in the Principality of Waldeck and Pyrmont (which see), 34 miles S.S.W. of Hanover. Small but well built, with several fine promenades, it contains a palace, and a very complete bathing establishment. The water is chalybeate, possessing valuable medicinal properties. Over 100,000 bottles of water are annually exported. Pop. 1401.

Pyro-electricity, a name given to electricity produced by heat, as when tourmaline becomes electric by being heated between 10° and 100° Cent.

Pyrogallic Acid ($C_6H_6O_3$), an acid obtained by the dry distillation of gallic acid (which see). It forms crystals that have neither smell nor colour, is readily soluble in water, alcohol, and ether, has a neutral reaction, readily absorbs oxygen in an alkaline solution, and becomes of a dark brown colour. It is used in photography, and sometimes as a hair-dye.

Pyr'ola. See *Winter-green*.

Pyrolig'neous Acid, an impure acetic acid obtained by the distillation of wood.

Pyrol'usite, a black ore of manganese, occurring crystallized and massive in Devonshire, Warwickshire, Thuringia, Brazil, and other places. It is the binoxide or peroxide of manganese, and is much used in chemical processes.

Pyrom'eter, any instrument, the object of which is to measure all gradations of temperature above those indicated by the mercurial thermometer. Wedgwood's pyrometer, the first which came into extensive use, was used by him for testing the heat of his pottery and porcelain kilns, and depended on the property of clay to contract on exposure to heat. Many different modes have been proposed or actually employed for measuring high temperatures; as by contraction, as in Wedgwood's; by the expansion of bars of different metals; by change of pressure in confined gases; by the amount of heat imparted to a cold mass; by the fusing-point of solids; by colour, as red and white heat, &c.

Py'rope, fire-garnet or Bohemian garnet, a dark-red variety of garnet, found embedded in trap tufa in the mountains of Bohemia. It occurs also in Saxony in serpentine.

Pyr'ophone, a musical instrument, in which the various notes are produced by the burning of hydrogen gas within glass tubes of various sizes and lengths.

Pyr'oscope, an instrument for measuring the intensity of heat radiating from a hot body, or the frigorific influence of a cold body.

Pyro'sis, in medicine, a disease of the stomach attended with a sensation of burning in the epigastrium, accompanied with an eructation of watery fluid, usually insipid, but sometimes acrid. It is commonly called *Water-brash*.

Pyroso'ma, a genus of phosphorescent Molluscoida, of the group Tunicata, compound ascidians inhabiting the Mediterranean and Atlantic. They unite in great numbers, forming a large hollow cylinder, open at one end and closed at the other, swimming in the ocean by the alternate contraction and dilatation of its component individual animals.

Py'rotechny, the science of making and using artificial fire-works, the chief ingredients of which are nitre, sulphur, and charcoal. Iron filings yield bright red and white sparks. Steel filings and cast-iron borings contain carbon, and give a more brilliant fire with wavy radiations. Copper filings give flame a greenish tint, those of zinc a fine blue colour; the sulphuret of antimony gives a less greenish blue than zinc, but with much smoke; amber, resin, and common salt give a yellow fire. Lampblack produces a very red colour with gunpowder, and a pink with nitre in excess. Verdigris imparts a pale green, sulphate of copper and sal-ammoniac a palm-tree green. Lycopodium, used also in the manufacture of stage-lightning, burns with a rose colour and a magnificent flame. See *Fire-works*.

Pyroxyl'ic Spirit, a common name for methylic alcohol or wood-spirit. See *Methyl*.

Pyrox'yline, a term embracing gun-cotton and all other explosive substances obtained by immersing vegetable fibre in nitric or nitro-sulphuric acid, and then suffering it to dry. These substances are nitro-derivatives of cellulose.

Pyrrha. See *Deucalion*.

Pyrrhic Dance, an ancient Grecian warlike dance, which consisted chiefly in such an adroit and nimble turning of the body as represented an attempt to avoid the strokes of an enemy in battle, and the motions necessary to perform it were looked upon as a kind of training for war.

Pyrrho, a Grecian philosopher of Elis, founder of the Pyrrhonian or sceptical school, flourished about 340 B.C. He was early led to apply himself to philosophy by the writings of Democritus, and, accompanying his master, Anaxarchus, to India, in the train of Alexander the Great, he there became acquainted with the doctrines of the Brahmans, Magi, and other eastern philosophers. Spending a great part of his life in solitude, and abstaining from all decided opinions concerning moral and physical phenomena, he endeavoured to attain a state of tranquillity not to be affected by fear, joy, or sorrow. He died in his ninetieth year; the Athenians erected a statue in honour of him, and his countrymen, who had made him a high-priest, raised a monument to his memory. His chief doctrines were the uncertainty of all human knowledge, and the belief that virtue is the only good. Pyrrho left no writings. It is only from the works of his later followers, particularly Sextus Empiricus, that we learn the principles of his school. A disposition to doubt is often called, from this philosopher, *Pyrrhonism*.

Pyrrhus, King of Epirus, one of the most illustrious generals of antiquity, was born about 318 B.C., and was left an orphan in childhood. He was placed on the throne of his ancestors when about twelve years of age, and reigned peacefully five years, when advantage was taken of his absence to transfer the crown to his great-uncle, Neoptolemus. After serving with his brother-in-law Demetrius Poliorcetes, and greatly distinguishing himself at the battle of Ipsus, against Antigonus, B.C. 301, Pyrrhus recovered his dominions, which he shared with his rival, and then caused the latter to be put to death. He next contended for possession of Macedonia, and in 280 passed over into Italy to assist the Greeks against Rome. He defeated the Romans in two battles, but with severe loss to himself; then passed over into Sicily, returned to Italy again, and was defeated at Beneventum 275 B.C. He now retired to Epirus, took part in the Greek troubles, and was killed at Argos, B.C. 272.

Pyrus, a genus of ornamental and fruit trees, the latter forming the chief of our

orchard fruit, and belonging to the pomeous section of the nat. order Rosaceæ. There are about forty species, natives of the north temperate and cold regions. The pear (*P. communis*), the apple or crab (*P. Malus*), service-tree (*P. torminālis* and *domestica*), mountain-ash or rowan-tree (*P. Aucuparia*), beam-tree (*P. Aria*), &c., all belong to this genus.

Pythag'oras, a Grecian philosopher, supposed to have been born about 586 B.C. at Samos. He went to Scyros, and was a scholar of Pherecydes till the death of the latter; others make him also a scholar of Thales and Anaximander. He is said to have gathered knowledge from the philosophers or learned men of Phœnicia, Syria, Egypt, Babylon, India, &c., but eventually settled at the Greek city of Crotona in Lower Italy, probably about 529 B.C. His abilities and character led great numbers, chiefly of the noble and wealthy classes, to adopt his views. Three hundred of these were formed into a select fraternity or order, and were bound by vow to Pythagoras and each other, for the purpose of cultivating the rites and observances enjoined by their master, and studying his philosophy. They thus formed at once a philosophical school and a religious order. The political influence of this body became very considerable, and was exerted in the interest of the aristocratic party. The democratic party strenuously opposed the growing power of the order, and their enmity caused Pythagoras to retire to Metapontum, where he died about 506 B.C. So far as we can judge, his system appears to owe very much to a vivid imagination acting upon the then prevailing ignorance respecting the order of nature. What was not known was guessed at, with the usual result. In the case of Pythagoras, as in that of other teachers of those early times, the popular effect of this partial knowledge was heightened by mingling it with secret doctrines. One of these doctrines was the transmigration of souls; and Pythagoras is said to have believed himself to have previously lived in several bodies. He had also abstruse theories respecting numbers, geometry, and music, which he valued very highly as fitting the soul for contemplation. The effect of his teaching, however, was such that his disciples are said to have paid him divine honours after his death. In appearance he was grave, commanding, and dignified. He abstained from all animal food, limiting himself to a vegetable diet. His public instruction consisted of practical discourses in which he recommended virtue and dissuaded from vice, with a particular reference to the various relations of mankind, as those of husbands and wives, parents and children, citizens and magistrates, &c. His disciples were required to practise the greatest purity and simplicity of manners. He imposed upon them, it is said, a silence of from two to five years, according to circumstances. He alone who had passed through the appointed series of trials was allowed to hear the word of the master in his immediate presence. To the initiated the doctrines were not delivered, as to others, under the mask of images and symbols, but unveiled. Pythagoras left no writings; the Golden Sentences extant under his name having been composed or compiled by later hands.

Pythagore'an Bean, the *Nelumbium speciosum*. See *Nelumbium*.

Pythagore'an Theorem, the forty-seventh proposition of the first book of Euclid's Elements, which shows that in any right-angled triangle the square of the hypotenuse is equal to the sum of the squares of the other two sides.

Pyth'eas, a famous navigator of the Greek colony of Massilia, now Marseilles, supposed to have lived about the time of Alexander the Great (say 330 B.C.). He is reputed to have sailed along the west coast of Europe, entered the English Channel, and travelled some distance in Britain, then, continuing his journey northward, to have arrived at Thule (supposed to be Iceland). In a second voyage he entered the Baltic, where he proceeded as far as a river which he called Tanais, and on the banks of which amber was found. We only know of him through Strabo, Pliny, and others.

Pythian Games, one of the four great Grecian games, instituted in honour of Apollo, and celebrated at Delphi. Until about 586 B.C. they were under the management of the Delphians, and took place every eighth year; but after that date they were conducted by the Amphictyons, and celebrated every fourth year, prizes being given for flute-playing, athletic sports, and horse and chariot racing. Eventually contests in tragedy, painting, sculpture, &c., were added. At first prizes of silver or gold were awarded, but afterwards the simple laurel wreath and palm-branch were substituted. They continued to be celebrated until the end of the 4th century of our era.

Python, a genus and family of serpents allied to the family Boidæ or Boas. They are not venomous, but kill their prey by compression. The pythons belong exclusively to the Old World, and are of enormous size, sometimes attaining a length of 30 feet. They are found in India and in the islands of the Eastern Archipelago, in Africa and in Australia. A rudimentary pelvis and traces of hinder limbs exist in the pythons, these structures terminating externally in a kind of hooked claw. The head exceeds the neck in thickness, and the mouth is extremely large. Aided by their prehensile tails and rudimentary hinder limbs, the pythons suspend themselves from the branches of trees and lie in wait near water for animals which come to drink. The genus *Python* contains various species, the best known of which is the West African python (*P. sebæ*), common in menageries. The female python hatches her eggs by the heat of her body.

Py'thoness, the priestess of Apollo at his temple at Delphi, who gave oracular answers. See *Delphi*.

Pyx (Greek, *pyxis*, a box), a covered vessel used in the Roman Catholic Church to contain the consecrated host. In ancient times, although generally rectangular in shape, it sometimes had the form of a dove, and was suspended above the altar. It is now cylindrical, cup or bell shaped, with a cross-surmounted cover, and is frequently delicately chased and inlaid.

Pyx, Trial of the, the final trial by weight and assay of the gold and silver coins of the United Kingdom, prior to their issue from the mint, a certain number being taken and tested by way of sample of the whole. The trial takes place periodically by a jury of goldsmiths summoned by the lord-chancellor, and constitutes a public attestation of the standard purity of the coin. The term is also applied to the assaying of gold and silver plate, which takes place at the different assay-offices.

Pyxid'ium, in botany, a capsule with a lid, as seen in henbane and in the fruit of *Lecythis Ollaria*, the monkey-pot tree, a large forest tree of Brazil. The term is also applied to the theca of mosses.

Q.

Q, the seventeenth letter in the English alphabet, a consonant having the same sound as *k* or hard *c*. It is a superfluous letter in English, as the combination *qu*, in which it always occurs, could be equally well expressed by *kw* or *k* alone when the *u* is silent. It did not occur in the Anglo-Saxon alphabet, the sound *qu* in Anglo-Saxon words being regularly written *cw* or *cu*, but was borrowed from the French-Latin alphabet.

Quadi, a Teutonic tribe whose ancient territory was on the Danube, extending to the Theiss on the east and to the Carpathian Mountains on the north. They long waged destructive wars with the Romans, particularly under Marcus Aurelius, but cease to be heard of in the 5th century, having probably migrated further west with the Suevi.

Quadragesima, a Latin word signifying fortieth, and used to denote the forty days of fast (Lent) preceding Easter. Quadragesima Sunday is the first Sunday in Lent. See *Lent*.

Quadran'gle, in geometry, a quadrilateral figure; a plane figure having four sides, and consequently four angles. In ordinary language it is a square or quadrangular court surrounded by buildings, as often seen in the buildings of a college, school, or the like.

Quad'rant, an instrument for measuring angular altitudes, variously constructed and mounted for different specific uses in astronomy, navigation, surveying, &c., consisting originally of a graduated arc of 90°, with an index or vernier, and either plain or telescopic sights, along with a plumb-line or spirit-level for fixing the vertical or horizontal direction. Its principle and application is the same as that of the sextant, by which it is superseded. See *Sextant*.

Quadrate Bone, a bone developed in reptiles and birds, by means of which the lower jaw is articulated or joined to the skull. The lower jaw of these forms is thus not articulated directly or of itself to the skull, as in mammals.

Quadratic Equations. See *Equation*.

Quad'rature, in astronomy, the position of the moon or a planet when its longitude differs from that of the sun by 90°, that is when it is 90° distant from the sun.—*Quadrature of the circle*, the squaring of the circle. See *Circle*.

Quadri'ga, an ancient two-wheeled car or chariot drawn by four horses abreast. It was used in racing in the Greek Olympian games, and in the games of the Roman circus.

Quadrilateral, a name given to the space inclosed between, and defended by, four fortresses in Northern Italy famous in Austro-Italian history, namely, Peschiera and Mantua on the Mincio, and Verona and Legnago on the Adige.

Quadrille', a dance of French origin, which consists generally of five consecutive figures or movements, danced by four sets of couples, each forming the side of a square.

Quadrille', a game at cards, played by four persons, with a pack of forty cards, the eight, nine, and ten of each suit being thrown aside. Quadrille was very popular and fashionable in England about the beginning of the century, but is now almost forgotten. *Ombre*, the game celebrated by Pope in his Rape of the Lock, is essentially the same game, but played by three persons instead of four.

Quadriv'ium, the name given by the schoolmen of the middle ages to the four mathematical branches of study, arithmetic, music, geometry, and astronomy.

Quadru'mana ('four-handed'), the name applied by Cuvier and others to denote the order of mammalia represented by the lemurs, monkeys, and apes, from the fact that these forms agree in possessing a great toe so constructed as to be capable of opposing the other digits of the feet, instead of being placed parallel with the other toes, thus forming a kind of 'hand' adapted for supporting the foot on the ground. This conversion of the feet into hand-like organs presented to Cuvier's mind so different and remarkable a structure from the disposition of the feet and toes of man, that he separated man as a sole and single genus to represent the distinct and opposing order of *Bimana* or 'two-handed' mammalia. But in modern zoology, man is generally included in one order with the apes and monkeys—the order Primates, of which man constitutes a distinct family or section. As limited to the apes, monkeys, and lemurs, the Quadrumana are characterized by the following points:—The hallux (innermost toe of the hind-limb) is separated from the other toes, and is opposite to them, so that the hind-feet become prehensile hands. The pollex (innermost toe of the fore-limbs) may be wanting, but when present it also is usually opposable to the other digits, so that the animal becomes truly quadrumanous, or four-handed. The teats are two in number, and the mammary glands are on the chest as in man. See *Monkeys*, *Apes*, &c.

Quadruped, the name popularly applied to those higher vertebrate animals which possess four developed limbs. The name is usually restricted to four-footed mammals.

Quadruple Alliance, an alliance, so called from the number of the contracting parties, concluded in 1718 between Great Britain, France, and Austria, and acceded to by Holland in 1719, for the maintenance of the Peace of Utrecht. The occasion of the alliance was the seizure by Spain of Sardinia in 1717, and Sicily in 1718, both of which she was forced to give up. Another quadruple alliance was that of Austria, Russia, Great Britain, and Prussia, in 1814, originating in the coalition which had effected the dissolution of the French Empire.

Quæstor, the name of certain magistrates of ancient Rome whose chief office was the management of the public treasure, being receivers of taxes, tribute, &c. Quæstors accompanied the provincial governors and received taxes, paid the troops, &c. The office could at first be held only by patricians until 421 B.C., when the number, which had formerly been two, was doubled, and plebeians became eligible. The number was further increased to eight after the outbreak of the first Punic war. As province after province was added to the Roman territory the number of quæstors was again increased, till under Sulla it reached twenty, and in the time of Julius Cæsar forty.

Quagga (*Equus Quagga*), a species of the horse genus, nearly allied to the zebra, and formerly found on the plains of Southern Africa. Striped like the zebra, it yet possessed no bands on the limbs; of a dark or blackish-brown on the head, neck, and shoulders, the back and hind quarters were of a lighter brown, whilst the croup was of a russet gray. The under parts of the body were white, the upper parts of the legs and tail being marked by whitish bars. The quagga was of smaller size than the zebra, and in general conformation bore a closer resemblance to the horse. Gregarious in habits, the quagga is said to have mingled indiscriminately with the zebra herds. Its food consisted of grasses and mimosa leaves. It is now said to be absolutely extinct. The animal to which the name quagga is now applied is Burchell's zebra. See *Dauw*.

Quail (*Coturnix*), a genus of rasorial birds, included in the family of the partridges, to which they are nearly allied, but from which they differ in being smaller, in having a relatively shorter tail, no red space

Common Quail (*Coturnix vulgaris*).

above the eye, longer wings, and no spur on the legs. The common quail (*C. vulgāris*) is a migratory bird, and is found in every country of Europe, and in many parts of Asia and Africa. It is about 8 inches in length. The colour of the upper parts is brownish with lighter and darker markings, of the under parts yellowish. The quail is very pugnacious, and in some places quail fights are a form of amusement, as was the case also in ancient times. Its flesh is deemed excellent food, and large numbers are brought alive and dead from the Continent to the British markets. In Britain these birds arrive early in May, and depart southwards in October. There are several other species, in appearance and habits not greatly differing from the common quail, as the Coromandel quail (*C. textilis*), the Australian quail (*C. australis*), the white-throated quail (*C. torquāta*), the Chinese quail (*C. excalfactoria*), an elegant little species measuring only 4 inches in length, &c. The name quail is also given to some birds of other genera, as the Virginia or Maryland quail (*Ortyx*), and the Californian or crested quail (*Lophortyx*). The Virginian quail is common throughout North America, and extends as far south as Honduras. It is rather larger than the European quail. The flesh is very white and tender, and is unequalled in delicacy by any other member of its order in America.

Quakers, a society of Christians which took its rise in England about the middle of the 17th century. George Fox, a native of Drayton, in Leicestershire, was the first to teach the religious views which distinguish the society. He commenced his ministerial labours in 1647, and immediately fell under persecution. But persecution, as usual, enlisted the sympathies of many in his cause. After making multitudes of converts he organized them into a church, which became, although not until after severe persecution, one of the recognized sects of Christianity. Among the other eminent members of the society in its early days we may mention William Penn, Robert Barclay, George Whitehead, Stephen Crisp, Isaac Pennington, John Crook, Thomas Story, &c. The early Quakers were marked as a peculiar people by their testimonies against oaths, a paid ministry, and tithes; their use of the singular pronouns when addressing only one person; their refusal to take off the hat as a compliment to men; the plainness of their apparel; and their disuse of the ordinary names of the months and days. The name Quakers was given to them in derision, and though they accepted the name they call themselves by that of Friends. A Derby magistrate was the originator of the derisive epithet according to Fox himself —'because I bade him tremble at the word of God.' The persecution and intolerance, of which they were the victims both in England and America, only tended to confirm the faith and strengthen the bond of union among the members of the rising society; and in neither country could it induce the sufferers to relinquish their conformity to what they regarded as duty. From the diffusion of more enlightened views on the subject of religious liberty, acts were successively passed by the English parliament, relieving Friends from the oppression under which they suffered, tolerating their mode of worship, marriage, &c., and allowing them in a court of justice to make an affirmation in place of taking an oath in the usual way. The same liberal policy was pursued in America. One of the brightest chapters in the annals of Quakerism is that relating to the founding of the colony of Pennsylvania. (See *Penn, William, Pennsylvania.*) But, as in other reforming sects, so among the Quakers, success in the course of time gradually undermined their zeal, and deprived them of many of their characteristic qualities. Gradually the spread of wealth modified the stringency of their 'sumptuary' rules, and there was in consequence a rapid decline of the ancient discipline. Coincident with these relaxations of rule arose disputes as to doctrine. About the year 1827 Elias Hicks, a native of the state of New York, created a schism in the

society by promulgating opinions denying the miraculous conception, divinity, and atonement of Christ, and also the divine authority of the Scriptures. About half the sect in America followed Hicks, and have since been known as the Hicksite Friends. The schism made much stir among Quakers in Great Britain as well as in America, and a movement was begun in favour of higher education, and of a relaxation in the formality of the society. This movement, headed by Joseph John Gurney, of Norwich, was strenuously opposed by a body of Quakers in America, and the result was a division among the Orthodox Friends themselves, and the origin of a new sect, known as Wilburites, from John Wilbur, its founder.

The society, or the orthodox section of it, believes that, under the gospel dispensation, all wars and fightings are strictly forbidden; the positive injunction of Christ, 'Love your enemies,' &c., entirely precluding the indulgence of those passions from which only such contests can arise. They also believe that the express command, 'Swear not at all,' prohibits the Christian from the use of judicial as well as other oaths. In like manner, following the spirit of the Scriptures, they believe that a special call is necessary to constitute a true minister of the gospel, that the faithful minister should not preach for a pecuniary reward, that the essential baptism is of the Holy Ghost, not by water, and that the Lord's supper is also entirely of a spiritual nature. They therefore renounce both these sacraments so far as the ordinary outward forms are concerned. As to the cardinal doctrines of Christianity, the incarnation, crucifixion, resurrection, redemption through Christ's death, justification, &c., their beliefs are similar to those of orthodox Christians generally. The Quakers were one of the first sects to allow women to teach publicly. As early as 1727 they censured the traffic in slaves, and the efforts of the society had a great influence in bringing about their emancipation. They object to balls, gaming-places, horse-races, theatres, and music; also to the reading of plays, romances, and novels; and enjoin plainness of dress and the avoidance of ornaments.

The society is governed by its own code of discipline, which is enacted and supported by meetings of four degrees for discipline—namely, preparative, monthly, quarterly, and yearly meetings. The preparative digest and prepare the business for the monthly meetings, in which the executive power is principally lodged, subject, however, to the revision and control of the quarterly meetings, which are again subject to the supervision and direction of the yearly meetings. There are about 60,000 members and adherents in Britain, about 70,000 in the United States and Canada, besides small numbers in other countries.

Quaking Grass (*Briza*), a genus of grasses, so named from their spikelets being always in a state of tremulous motion, in consequence of the weakness of the footstalks by which they are supported. *Briza maxima*, a native of Southern Europe, has long been cultivated as a garden annual on account of its large and handsome drooping spikelets. *B. media*, a perennial plant, is the only species common in Britain, but *B. minor* is also a native.

Quam'ash, the North American name of *Camassia esculenta*, a plant of the lily family with an edible bulb. These bulbs are much eaten by the Indians, and are prepared by baking in a hole dug in the ground, then pounding and drying them into cakes for future use.

Quamoc'lit, a genus of climbing ornamental plants, nat. order Convolvulaceæ, chiefly found in the hot parts of America, but some species are indigenous both in India and China.

Quandang', the edible fruit of a species of sandalwood tree, *Santălum acuminātum*, called in Australia native peach.

Quangsee. See *Kwangsi.*

Quangtung. See *Kwangtung.*

Quantampoh, a town of Western Africa, in the Ashantee kingdom, about 100 miles north of Coomassie, and the seat of a considerable trade in slaves, cola-nuts, &c. Pop. 15,000.

Quantification of the Predicate, in logic, the use of some word or words to indicate whether the predicate of a proposition is distributed or not, that is, whether or not all the objects of which the predicate may be asserted are also objects of which the subject may (in affirmative propositions) be asserted or (in negative propositions) denied. Thus, when we say, Some men are logicians, we do not know from the form of the proposition whether we may not apply the predicate logicians to any who are not men, but if we quantify the predicate and say, Some men are all logicians, we at once show that this application cannot be made. Ploucquet and Lambert in the last century suggested the quantification of the predicate,

but Sir William Hamilton was the first to give notoriety to the doctrine by the importance that he attached to it, considering it as involving a complete revolution in formal logic. The doctrine of the quantification of the predicate was attacked immediately after his enunciation of it, and it has never been generally adopted in the exposition of formal logic.

Quantity, that property of anything, in virtue of which it is capable of being measured, increased, or diminished, relating to bulk, weight, or number. In mathematics a quantity is anything to which mathematical processes are applicable. In grammar it signifies the measure of a syllable, or the time in which it is pronounced—the metrical value of syllables as regards length or weight in pronunciation. In Latin and Greek poetry quantity and not accent regulates the measure.

Quantock Hills, a range of low elevation in England, in the county of Somerset, extending from the Bristol Channel, near Watchet, north-east to between Bridgewater and Taunton, and rising at their highest point to an elevation of 1428 feet above the sea-level.

Quanza, a river of Africa. See *Coanza*.

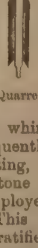
Qu'appelle (ka-pel'), a small town on the Canadian Pacific Railway, in the district of Assiniboia, a short distance east of Regina; also, the name of a river tributary to the Assiniboine.

Quar'antine (It. *quarantina*, a space of forty days), the period (originally forty days) during which a ship coming from a port suspected of contagion, or having a contagious sickness on board, is forbidden intercourse with the place at which she arrives. This form of quarantine is now confined to foreign countries where cholera, yellow fever, &c., have to be guarded against. In Britain quarantine is altogether abolished. If there be evidence or suspicion of infectious disease on board a vessel arriving in a British port, the customs-officers report the same to the port sanitary authorities, who have power to deal with cases under the Public Health Acts. Quarantine was originally introduced at Venice as a measure of protection against plague or leprosy about the middle of the 14th century, Venice, then the chief trading centre of the Mediterranean, being especially liable to contagion through vessels coming from Eastern ports. A lazaretto was early erected here in connection with the quarantine restrictions.

Quaregnon (kà-ren-yōn), a commune and colliery district of Belgium, province of Hainaut, 4 miles west of Mons. Pop. 13,121.

Quarles, FRANCIS, an English poet, born in 1592, near Rumford in Essex, educated at Cambridge, and entered at Lincoln's Inn. He was for some time cup-bearer to Elizabeth, queen of Bohemia, and in 1621 went to Dublin, where he became under-secretary to Archbishop Ussher. He was driven from Ireland, with the loss of his property, by the rebellion of 1641, and was appointed chronologer to the city of London. At the commencement of the civil wars he wrote a work entitled the Loyal Convert, which gave offence to the parliament; and when he afterwards joined the king at Oxford his property was sequestrated, and his books and MSS. plundered. He was so much affected by his losses, that grief is supposed to have hastened his death in 1644. Of the works of Quarles, in prose and verse, the most celebrated is his Emblems, a set of designs illustrated by verses. Among his poems are Divine Poems, Divine Fancies, and Argalus and Parthenia. His Enchiridion is a collection of brief essays and aphorisms, in vigorous and occasionally eloquent language.

Quarne'ro, GULF OF, in the Adriatic Sea, between Istria and the Croatian coast, 15 miles in length and breadth. It is nearly inclosed leewards by the islands of Cherso and Veglia, and communicates with the Adriatic by three channels. The seamen of that region dread the gulf on account of the terrific storms to which it is subject.



Quarrel.

Quarrel, a bolt or dart to be shot from a cross-bow, or thrown from a catapult, especially one with a square head and pyramidal point.

Quarry, an open excavation made for obtaining stone, such as granite, marble, sandstone, limestone, and slates. Stones suitable for important building purposes are usually found at a good distance below the surface. In the case of unstratified rocks, such as granite, whinstone, &c., the stone is most frequently detached from the mass by blasting, a process by which much valuable stone is wasted, and a different method is employed whenever it is found possible. This is frequently the case with some stratified rocks, such as sandstone, from which blocks are separated by hand-tools alone. Small holes a few inches asunder are cut along a

certain length of rock, into which steel wedges are inserted. These are driven in by heavy hammers until the stratum is cut through. The large blocks necessary for monumental purposes are generally obtained in this way, and before they leave the quarry they are usually reduced as nearly as possible to a rectangular form.

Quart, an English measure of capacity, being the fourth part of a gallon, or 8 gills.

Quartan Ague. See *Ague.*

Quarter, the name of two English measures, one of weight and the other of capacity. The first is the fourth part of a hundredweight, or 28 lbs. The second contains 8 bushels of 4 pecks.

Quarter, that part of a ship's side which lies towards the stern, or which is comprehended between the aft-most end of the main chains and the sides of the stern.

Quarter-days, in England, the day that begins each quarter of the year. They are Lady-day (25th March), Midsummer-day (24th June), Michaelmas-day (29th September), Christmas-day (25th December). These days have been adopted between landlord and tenant for entering or quitting lands or houses and for paying rent. In Scotland the legal terms are, Whitsunday (15th May) and Martinmas (11th November); the conventional terms Candlemas (2d February) and Lammas (1st August) make up the quarter-days.

Quarter-deck, the upper deck, or after-most part of the upper deck, of a vessel, extending from the main-mast to the stern, or to the poop (when there is one). In ships of war it is specially set apart for the officers.

Quartering, in heraldry, is dividing a coat into four or more quarters or quarterings, by perpendicular and horizontal lines, &c. See *Heraldry.*

Quarterly Review, an English review published every three months, founded in February, 1809, in opposition to the Whig Edinburgh Review, by John Murray, with the support of Canning, Sir Walter Scott, and other leaders of the Tory party. William Gifford was its first editor. From 1826 to 1853 it was presided over by Lockhart, the biographer and son-in-law of Scott. From 1867 to 1894 it was under the editorship of Dr. (Sir) William Smith. The Quarterly has from the first held a foremost place as a critical review.

Quarter-master, in the army, an officer who attends to the quarters for the soldiers, their provisions, fuel, forage, &c. There is a quarter-master attached to every regiment, battalion, &c., who generally holds the relative rank of lieutenant. A quarter-master in the navy is a petty officer appointed by the captain, who, besides having charge of the stowage of ballast and provisions, coiling of ropes, &c., attends to the steering of the ship.

Quartermaster-general, a staff officer of high rank in the army, whose department is charged with all orders relating to the marching, embarking, disembarking, billeting, quartering, and cantoning of troops, encampments and camp equipage. The quartermaster-general is attached to a whole army under a commander-in-chief, and generally holds the rank of major-general, while to every brigade is attached a deputy-assistant quartermaster-general.

Quartermaster-sergeant is a non-commissioned officer who acts as assistant to the quarter-master.

Quartern, a term sometimes used to designate the fourth of a peck, or of a stone; as the quartern-loaf. In liquid measure it is the fourth part of a pint.

Quarter-sessions, in England, a general court of criminal jurisprudence held quarterly by the justices of the peace in counties, and by the recorder in boroughs. The jurisdiction of these courts, originally confined to matters touching breaches of the peace, has been gradually extended to the smaller misdemeanours and felonies, but with many exceptions. There is also an extensive jurisdiction in matters relating to the settlement of the poor, highways, vagrancy, bastardy, &c., in most of which cases an appeal lies to the higher courts. In Scotland the quarter-sessions are a court held by the justices of the peace four times a year at the county towns. These courts have the power of reviewing the sentences pronounced at the special and petty sessions when the sentence is of a nature subject to review. Such cases as fall to be tried by the English courts of quarter-sessions are chiefly disposed of in Scotland in the sheriff courts of the county.

Quarter-staff, an old English weapon formed of a stout pole about 6½ feet long, generally loaded with iron at both ends. It was grasped by one hand in the middle, and by the other between the middle and the end. In the attack the latter hand shifted from one quarter of the staff to the other, giving the weapon a rapid circular motion, which

brought the loaded ends on the adversary at unexpected points.

Quartet', or QUARTETT', a musical composition for four instruments, generally stringed instruments (that is, two violins, one viola or tenor violin, and one violoncello); also a composition for four voices, with or without accompaniment.

Quarto (4to), a book of the size of the fourth of a sheet; a size made by twice folding a sheet, which then makes four leaves.

Quartz, the name given to numerous varieties of the native oxide of silicon, called also silicic acid. Quartz embraces a large number of varieties. When pure its composition is expressed by the formula SiO_2. It occurs both crystallized and massive, and in both states is most abundantly diffused throughout nature, and is especially one of the constituents of granite and the older rocks. When crystallized it generally occurs in hexagonal prisms, terminated by hexagonal pyramids. It scratches glass readily, gives fire with steel, becomes positively electrical by friction, and two pieces when rubbed together become luminous in the dark. The colours are various, as white or milky, gray, reddish, yellowish or brownish, purple, blue, green. Quartz veins are often found in metamorphic rocks, and frequently contain rich deposits of gold. The principal varieties of quartz known by distinct names are the following: 1, *rock-crystal;* 2, *smoky quartz;* 3, *yellow quartz;* 4, *amethyst;* 5, *siderite* or *blue quartz;* 6, *rose quartz;* 7, *milky quartz;* 8, *irised quartz;* 9, *common quartz;* 10, *fat* (*greasy*) *quartz;* 11, *flint;* 12, *hornstone;* 13, *Lydian stone;* 14, *floatstone* (*swimming stone*); 15, *fibrous quartz;* 16, *radiating quartz;* 17, *chalcedony;* 18, *carnelian;* 19, *chrysoprase;* 20, *agate.* The name rock-crystal is applied to transparent and colourless crystals. Smoky quartz consists of crystals and crystalline masses which are translucent and of a brown colour. Yellow quartz, sometimes called *Bohemian* or *Scottish topaz*, is transparent, and of various shades of yellow. Amethyst is of every shade of violet, and nearly transparent. Siderite is of an azure-blue colour, and never in regular crystals. Rose quartz is of a rose-red colour. Milky quartz is massive, translucent, and of a milk-white colour. Irised quartz exhibits the colours of the rainbow. Fat or greasy quartz has the appearance of having been immersed in oil. Flint has a more compact texture than common quartz, is dull, only translucent on the edges, of a brownish colour, and breaks with a conchoidal fracture. Hornstone resembles flint, but its conchoidal fracture is less distinct. Lydian stone differs from flint chiefly in having a darker colour, less translucency, and a fracture somewhat slaty; when black it is often called *basanite.* Floatstone consists of a delicate tissue of minute crystals, visible only under a powerful magnifier. Owing to the cavities it contains it will sometimes float on water. Fibrous quartz consists of those varieties which are in distinct parallel concretions. Radiating quartz is like fibrous quartz, except that the fibres diverge from a common centre, and resemble the radii of a circle, instead of being parallel. Chalcedony includes those varieties of radiating quartz where the thickness of the individuals becomes so much diminished as to render them nearly or altogether impalpable. Carnelian differs from chalcedony merely in having a blood-red colour. Chrysoprase also resembles chalcedony in composition, except that it is granular instead of fibrous; its colour is apple-green. Agate implies the occurrence of two or more of the above varieties existing together in intimate union. Cat's eye, avanturine, prase, plasma, heliotrope, Compostella hyacinth, jasper (red, brown, striped, and porcelain), jasper agate, Mocha stone, Venus-hair agate, &c., formerly included under quartz, are only mixtures of this mineral with other substances. Several varieties of quartz are of important use in the arts and manufactures. The ancients regarded rock-crystal as petrified water, and made use of it for the fabrication of vases. At present it is employed not only for cups, urns, chandeliers, &c., but for seals, spectacle-glasses, and optical instruments. Quartz enters into the composition of glass, both white and coloured. In the manufacture of porcelain it is added in the state of an impalpable powder, and forms part of the paste; it is also used in other kinds of pottery. Quartz is used as a flux in the melting of several kinds of ores, particularly those of copper, and in other metallurgical processes. Touchstone is a hard velvety-black variety of Lydian stone.

Quartzite, QUARTZ-ROCK, a metamorphic stratified granular-crystalline rock consisting entirely, or almost entirely, of quartz. It is usually a sandstone which has been altered by heat, &c. It is generally of a grayish or pinkish-gray colour, from a slight trace of iron.

Quass, or KVASS, a sour, fermented liquor, made by pouring warm water on rye or barley meal, and drunk by the peasantry of Russia.

Quassia is a genus of South American tropical plants, consisting of trees and shrubs, natural order Simarubaceæ. The wood of two species is known in commerce by the name of *Quassia; Q. amāra*, a native of Panamá, Venezuela, Guiana, and Northern Brazil, a small tree with handsome crimson flowers; and *Q. excelsa* (*Picræna excelsa*, Lindley), a native of Jamaica. The latter furnishes the *lignum quassiæ* of the British Pharmacopœia. Both kinds are imported in billets, and are inodorous, but intensely bitter, especially the Jamaica quassia. Quassia is a pure and simple bitter, possessing marked tonic properties. An infusion of quassia sweetened with sugar is useful to destroy flies. *Q. excelsa* was formerly substituted by some brewers for hops, but is now prohibited under severe penalties. See also *Bitter-ash*.

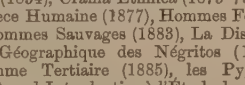
Quater'nions, the name given by Sir William Rowan Hamilton to a method of mathematical investigation discovered and developed by him. It is most important in its applications to physics, especially in crystallography, optics, kinematics, and electro-dynamics. According to the discoverer, 'A *Quaternion* is the quotient of two vectors, or of two directed right lines in space, considered as depending on a system of *Four Geometrical Elements;* and as expressible by an algebraical symbol of *Quadrinomial Form.* The science, or *Calculus*, of *Quaternions*, is a new mathematical method wherein the foregoing conception of a *quaternion* is unfolded, and symbolically expressed, and is applied to various classes of algebraical, geometrical, and physical questions, so as to discover many new theorems, and to arrive at the solution of many difficult problems.'

Quathlamba Mountains, a range in South Africa, forming the western boundary of Natal; also called the Drakenberg Mountains (which see).

Quatre-Bras (kà-tr-brä), a village of Belgium, in the province of South Brabant, 20 miles S.S.E. of Brussels, situated at the intersection of the main roads between Brussels and Charleroi, and from Nivelle to Namur. It is famous for the battle fought here (16th June, 1815) between the English under Wellington and the French under Ney, in which the former were victorious.

Quatrefages de Bréau (kä-tr-fäzh dė brā-ō), JEAN LOUIS ARMAND DE, French naturalist, born in 1810; took his M.D. degree at Strasburg in 1838; and has been professor of zoology at Toulouse, the Lycée at Paris, and professor of anatomy and ethnology at the Musée d'Histoire Naturelle. He was elected a member of the Royal Society, London, in 1879. His contributions to science include numerous researches into the lower grades of life, and a valuable series of anthropological studies. Among his more important works are Souvenirs d'un Naturaliste (1854), Crania Ethnica (1875–79), De l'Espèce Humaine (1877), Hommes Fossiles et Hommes Sauvages (1883), La Distribution Géographique des Négritos (1883), l'Homme Tertiaire (1885), les Pygmées (1887), and Introduction à l'Étude des Races Humaines (1887–89). He died in 1892.

Quatrefoil (kwą'tėr-foil), in architecture, an opening or a panel divided by cusps or foliations into four leaves, or more correctly the leaf-shaped figure formed by the cusps.



Quatrefoils.

It is an ornament which has been supposed to represent the four leaves of a cruciform flower, and is common in the tracery of Gothic windows. Bands of small quatrefoils are much used as ornaments in the perpendicular Gothic style, and sometimes in the decorated. The same name is also given to flowers and leaves of similar form carved as ornaments on mouldings, &c.

Quaver, a note and measure of time in music, equal to half a crotchet or the eighth of a semibreve. See *Music*.

Quay (kē), a landing-place substantially built along a line of coast or a river bank, or round a harbour, and having posts and rings to which vessels may be moored, frequently also cranes and storehouses for the convenience of merchant ships.

Quebec', a city and shipping port of the Dominion of Canada, capital of the province of the same name, situated on a promontory near the confluence of the St. Charles with the St. Lawrence, terminating abruptly in Cape Diamond, which has a height of 333 feet, and on the banks of both streams. It is about 400 miles from the mouth of the St. Lawrence and 140 miles north-east of

Montreal, to which the river is navigable for large vessels. It is divided into the upper and lower towns. The former, placed on the summit of the promontory, is strongly fortified, the fortifications comprising a citadel and other works. The view from the heights here looking down the river is one of the finest in the world. The lower town, the great seat of business, lies under the cliffs, along the St. Lawrence and the St. Charles. The streets are mostly narrow, irregular, and frequently steep, excepting in the suburbs, which are modern and built upon a more regular plan. Among the principal edifices are the parliament buildings, the Roman Catholic cathedral, the Protestant cathedral, the new court-houses, the new town-hall, and the Scotch Church. The chief educational institution is Laval University, with faculties of law, medicine, theology, and arts, and a library of nearly 80,000 volumes. Another great educational institution is the Grand Seminary. The chief convent is the Ursuline convent, covering 7 acres of ground, and having connected with it an extensive establishment for the education of females. On the Plains of Abraham, west of the upper town, a column 40 feet high has been erected to the memory of General Wolfe; while in the upper town there is a handsome obelisk, 65 feet high, to the joint memory of the two commanders, Wolfe and Montcalm, who both fell at the taking of Quebec. Shipbuilding is the chief industry. There are also manufactures of iron-castings, machinery, cutlery, nails, leather, paper, india-rubber goods, rope, tobacco, beetroot-sugar, &c. Quebec is the chief seat of the Canadian trade in timber, immense quantities of which are here accumulated, so that at certain seasons rafts moored within booms may be seen extending along the water's edge for 6 miles. The basin of the St. Lawrence immediately below the town, where it is 2500 yards wide, affords excellent anchorage for ships of large tonnage, while the wharves along the banks of both rivers afford accommodation for the largest vessels. The river is free from ice usually from the 1st of April till middle of December. Quebec was founded in 1608 by Champlain, who was sent on an exploring expedition from France. In 1629 it came into the hands of the English, but was restored in 1632 to the French, in whose possession it remained till 1759, when it fell into the hands of the British in consequence of Wolfe's famous victory on the Plains of Abraham. The great bulk of the inhabitants (more than five-sixths) are Roman Catholics, chiefly French Canadians. Pop. about 65,000.

Quebec, a province of the Dominion of Canada, lying mainly between 52° 30′ and 45° N. lat., and between 57° 7′ and 79° 33′ W. lon. It is bounded on the N. by Labrador and the North-east Territory of Canada; on the E. by Labrador and the Gulf of St. Lawrence; on the S. by the Chaleurs Bay, New Brunswick, and the states of Maine, New Hampshire, Vermont, and New York; and on the S.W. by the River Ottawa, which separates it from the province of Ontario. It is nearly 1000 miles in length from E. to W. by 300 in breadth, and has an area of 188,694 square miles. The surface of the country is very varied, being diversified by mountains, rivers, lakes, and extensive forests. The chief mountains are the Notre Dame or Shickshock Mountains, extending along the south side of the St. Lawrence, and forming a table-land 1500 feet high, with peaks rising to the height of 4000 feet; and the Laurentian Mountains, or Laurentides, which stretch from the coast of Labrador to the Ottawa River, and rise to a height of from 1200 to 4000 feet. The chief islands are Anticosti, at the mouth of the St. Lawrence, and the Magdalen Islands in the Gulf of St. Lawrence. The chief river is the St. Lawrence, which flows through the entire length of the province. Next to it in importance is its chief tributary, the Ottawa, over 700 miles in length. The other largest rivers are the St. Maurice and the Saguenay. The province boasts many beautiful lakes, the chief being Grand Lake, Temiscamingue, and Lake St. John, from which issues the Saguenay. The climate is variable, though salubrious, the temperature ranging from 20° below zero in winter to 90° in summer. The soil is generally fertile, and well suited for the growth of cereals, hay, &c.; maize, flax, and tobacco are also grown, especially to the west of the longitude of Quebec, while grapes, melons, peaches, and tomatoes in this region come to maturity in the open air. A large portion of the province is still covered with forest, the white and red pines and the oak being the most valuable trees for timber. The fisheries are extensive and valuable. The minerals worked include apatite, asbestos, gold, copper, iron, plumbago, &c. The manufactures are steadily increasing, and include furniture, leather, paper, chemicals, boots and shoes, woollen

goods, steam and agricultural machinery. The chief exports are timber and fish. The educational system embraces institutions of all grades, from primary schools upwards, at the top being three universities—Laval University, Quebec (R. Catholic); Macgill University, Montreal (Protestant); and Bishop's College, Lennoxville (Anglican). The affairs of the province are administered by a lieutenant-governor (appointed by the governor-general) and an executive council composed of 8 members, assisted by a legislative assemoly of 73 members and a legislative council of 24 members. The latter hold their appointments for life; the former are elected by the people for five years. The capital is Quebec, but Montreal is the largest town. Pop. (1891), 1,488,535, 1,291,709 being Roman Catholics, mostly of French descent.

Quebracho (ke-brä'chō), the name given to several trees of different genera, but with similar qualities, indigenous to South America, valuable alike for their wood and their bark. The red quebracho (*Loxopterygium Lorentii*, family Anacardiaceæ) is very hard, but splits easily. The bark and wood are used in tanning. The white quebracho (*Aspidosperma quebracho*) is used for wood-engraving. The bark contains six alkaloids, and is used therapeutically as a remedy for asthma, being employed as a decoction and a tincture.

Quedah, or KEDDAH, a small state on the west coast of the Malay Peninsula, north of Province Wellesley. It is a well-wooded and mountainous country, with numerous rivers, for the most part navigable. The climate is warm but healthy. The chief products are rice, pepper, ivory, and tin. Pop. 30,000. The capital, of the same name, has a population of 6000.

Quedlinburg (kwed'lin-bu*r*h), a town in the Prussian government of Magdeburg, province of Saxony, at the foot of the Harz Mountains, 35 miles S.W. of Magdeburg. On an eminence above the town is an old castle, once the residence of the abbesses of Quedlinburg, who, as princesses of the empire, had a vote in the diet. The manufactures are woollens, beet-root sugar, wire, leather, chemicals, &c. Pop. 19,323.

Queen (Anglo-Saxon, *cwēn*, a woman), the wife of a king. In Britain the queen is either *queen-consort* or merely wife of the reigning king, who is in general (unless where expressly exempted by law) upon the same footing with other subjects, being to all intents the king's subject, and not his equal; or *queen-regent*, regnant, or sovereign, who holds the crown in her own right, and has the same powers, prerogatives, and duties as if she had been a king, and whose husband is a subject; or *queen-dowager*, widow of the king, who enjoys most of the privileges which belonged to her as queen-consort. In Prussia, Sweden, Belgium, and France there can be no queen-regnant. See *Salic Law*.

Queen Anne's Bounty, a fund applied to the increase of the incomes of the poorer clergy of the Church of England, and to aid incumbents in rebuilding parsonages by granting advances of money, in virtue of a royal charter confirmed by 2 and 3 Anne, cap. xi. By this act the first-fruits (the whole income of an incumbency for the first year after a new appointment) and the tenths (a tenth of the annual income of every incumbency), which before the Reformation had been paid to the pope, but had been annexed to the crown by Henry VIII., were assigned to a corporation created by the act and intrusted with the duty of administering the fund for the purpose mentioned. The livings that benefit by the bounty are all those not exceeding £50 a year. All augmentations from this fund are conditional upon an equal or larger sum being privately raised for the same purpose.

Queen-bee, the sovereign of a swarm of bees, the only fully-developed and prolific female in the hive, all the other inhabitants being either males (that is drones) or neuters. See *Bee*.

Queenborough, a village of England, county of Kent, 2 miles south of Sheerness, on the Medway, whence a line of steamers runs to Flushing, affording a direct and rapid transit to the Continent. Pop. 1050.

Queen Charlotte Islands, a group of islands in the North Pacific Ocean, off the mainland of British Columbia, north of Vancouver Island, discovered by Cook about 1770, and annexed to the British crown in 1787. The northernmost of the two larger islands is called Graham Island, and the southernmost Moresby Island. The greatest length of the two together is about 160 miles, and the greatest breadth (of the northern island) about 70 miles. All the islands are covered with magnificent forests; gold-bearing quartz of rich quality has been found, and copper and iron ores and a fine vein of anthracite coal also exist. There are numerous creeks suitable for harbours. The

climate is excellent. The islands form part of British Columbia.

Queen Charlotte Sound, a channel in the North Pacific Ocean, separating Vancouver Island from the mainland of British America on the north, and forming the commencement of a long series of inlets continued along the north and east of that island.

Queen-of-the-meadows. See *Meadow-sweet.*

Queen's Bench (or KING'S BENCH), COURT OF, a separate court formerly existing in England, and divided into several branches for the trial of different kinds of pleas. With the Common Pleas and Exchequer it now forms the Queen's Bench Division of the High Court of Justice, and is presided over by the Lord Chief Justice of England. See *Bench,* and *Supreme Court of Judicature.*

Queens' College, Cambridge, was founded in 1448 by Margaret of Anjou, queen of Henry VI., and again in 1465 by Elizabeth, queen of Edward IV. The college buildings are among the most interesting in the university. John Fisher, Thomas Fuller, and Bp. Pearson were members of the college.

Queen's College, Oxford, was founded in 1340 by Robert Eglesfield, chaplain to Philippa, queen of Edward III., and it is from her that it gets its name. The subsequent foundations of John Michel, Sir Francis Bridgman, and lady Margaret Hungerford were consolidated into one with that of Eglesfield in 1858.

Queen's Colleges, Ireland, colleges three in number, situated respectively at Belfast, Cork, and Galway, and established in 1849 by an act of parliament passed in 1845 (8 and 9 Vict. cap. lxvi.), which granted £100,000 out of the consolidated fund for the purpose. They are at present regulated by the charters of 1863. The corporate body of each college consists of the president and professors, and the general government and administration are vested in a council consisting of the president and six members, elected by the professors from among themselves. The session of the Queen's Colleges extends from October to June. In their first session the students in arts study English, Greek, Latin, a modern language, and mathematics. In the second session logic, natural history, and two of the following, viz.:—Greek (second course), Latin (second course), a modern language (second course), and mathematics (second course). In the third session they study the English language and literature; metaphysics, or history, or political economy; chemistry; zoology or botany. There are also courses in medicine and law. Students of the Queen's Colleges may obtain degrees in arts, medicine, and law from the Royal University of Ireland (which see).

Queen's Counsel, in England barristers, and in Scotland members of the faculty of advocates, appointed counsel to the crown, and called within the bar. They have precedence over other barristers, and rank among themselves according to seniority. They are appointed by patent from the crown on the nomination of the lord-chancellor. They can act as judges of assize when named in the commission. It is the established etiquette of the profession that no queen's counsel conducts any case without the assistance of a junior counsel. The professional robes of queen's counsel are of silk instead of stuff like those of ordinary barristers; hence the phrase 'to take silk.' The first to be appointed to the rank of queen's counsel was Sir Francis Bacon in 1604.

Queen's County, a county of Ireland, in the province of Leinster, with an area of 664 sq. miles. The surface is generally flat, but rises in the north-west into the Slieve-Bloom Mountains, whose highest summit is 1734 feet above sea-level. Iron, copper, and manganese are found, but not worked. Limestone abounds, and in a few places marble is obtained. The soil is generally fertile, although bogs are numerous towards the centre of the county. The rivers Barrow and Nore both rise in the Slieve-Bloom Mountains. Agriculture is not generally in an improving state, drainage in particular being much wanted. The principal crops are oats, barley, potatoes, turnips, and mangel-wurzel. Queen's County is divided into two parliamentary divisions, each of which returns one member. Pop. 64,639.

Queensferry, SOUTH, a royal burgh and seaport of Scotland, in the county of Linlithgow, on the south side of the Firth of Forth, at a point where the latter narrows to a width of about 2 miles. The ferry at this point was at one time the principal means of communication between Edinburgh and the north of Scotland, but a great iron bridge now spans the Forth here. (See *Forth Bridge.*) Pop. 1531.—NORTH QUEENSFERRY is a village in Fifeshire, on the north shore of the Firth of Forth, opposite South

Queensferry, much frequented for sea-bathing. Pop. 360.

Queensland, an Australian colony, comprising the whole north-east portion of Australia north of New South Wales and east of S. Australia and its Northern Territory, being elsewhere bounded by the Gulf of Carpentaria, Torres Strait, and the Pacific. A considerable portion is thus within the tropics, the most northern part forming a sort of peninsula, known as York Peninsula. (See *Australia*.) It has an area of about 668,224 sq. miles, and is divided into twelve large districts, namely, Moreton (East and West), Darling Downs, Burnett, Port Curtis, Maranoa, Leichhardt, Kennedy, Mitchell, Warrego, Gregory, Burke, and Cook. Most of these districts are now subdivided into counties. Towards the west a large portion of the surface is dry and barren, but towards the east, and for a long stretch along the coast, boundless plains or downs, admirably adapted for sheep-walks, and ranges of hills, generally well wooded and intersected by fertile valleys, form the prevailing features of the country. The coast is skirted by numberless islands, and at some distance is the Great Barrier Reef. The highest mountains are near the coast, the greatest elevation being about 5400 feet. The principal rivers are the Brisbane, the Burnett, the Pioneer, the Fitzroy, and the Burdekin flowing into the Pacific, and the Flinders and Mitchell into the Gulf of Carpentaria. Some of these streams are navigable for a considerable distance inland. The coast is indented with many noble bays, affording some capacious natural harbours, which have already been brought into practical use as the outlets for the produce of the adjacent districts. The climate is healthy, and the temperature comparatively equable. The mean temperature at Brisbane is 69°, the extreme range being from 35° to 106°. In the more northern parts the climate is tropical. The rainfall in the interior is scanty and variable; the mean at Brisbane is about 35 inches. The indigenous animals and plants are similar to those of the rest of Australia. Crocodiles may be mentioned as inhabiting some of the northern rivers. There are many kinds of valuable timber trees, and a rare thing in Australia, a few good indigenous fruits. Sheep-farming is the chief industry, but agriculture (including sugar-growing), cattle rearing, and mining are also important. The soil and climate are well suited for the production of all the ordinary cereals, as well as maize, tobacco, coffee, sugar, cotton, &c. The chief products are sugar, maize, English and sweet potatoes, arrow-root, and semi-tropical fruits. Sugar-growing is becoming a very important industry. Gold, tin, lead, and copper are the principal minerals. The gold-fields extend over an area of 15,000 sq. miles, and employ about 10,200 miners. The yield of gold for the year 1894 was 679,511 ounces, value £2,378,300. The gross produce of gold in the colony from 1867 to the end of 1895 was valued at £37,000,000. Coal and plumbago are found in large quantities; and cinnabar, antimony, and manganese are also among the mineral products. The coal-measures are estimated to cover about 24,000 sq. miles, and coal is now raised. In the north pearl-fishing is actively carried on. The manufactures are unimportant. The principal manufactories, or works that may be classed as such, are sugar-mills, steam saw-mills, soap-works, agricultural implement works, and distilleries. There are now about 2400 miles of railways in operation, and nearly 12,000 miles of telegraph line, and the telephone is coming rapidly into use. Education is free and secular in the public schools, and is under a special department controlled by the minister for education. A Queensland university is about to be established. There is no established church, each religious denomination being entirely self-supporting. The principal imports are apparel and haberdashery, cottons and woollens, flour, iron and steel, boots and shoes, tea, spirits, hardware, machinery, wine, &c.; and the principal exports, wool (in 1895, £2,986,989), gold (to the value of £2,265,354), meat, £985,381; tallow, £595,992; sugar, £796,117; hides and skins, £456,506; live stock, £339,900. The value of the total imports in 1895 was £5,349,000, and of the exports £8,982,600. The staple articles of export to the United Kingdom are wool, tallow, and fresh and preserved meat. A very large number of the articles imported are subject to more or less heavy duties, a large portion of the revenue being thus raised. The revenue of the colony for the year 1895 was £3,561,717, and the expenditure £3,374,760. The public debt the same year amounted to about £32,000,000. The first settlement of Queensland took place in 1825, when the territory was used as a place of transportation for convicts, who continued to be sent there till 1839. In 1842 the country was opened to free settlers. It was originally a part of N. S. Wales, and

was organized as a separate colony in 1859. The government of the colony is vested in a governor, who is the queen's representative, and a parliament of two houses, the legislative council and the legislative assembly. The council consists of thirty-nine members appointed by the crown for life, and the assembly of seventy-two members elected by the people for five years, and representing sixty electoral districts. The capital of the colony is Brisbane. Other noteworthy towns are Rockhampton, Ipswich, Maryborough, Charters Towers, Townsville, Toowoomba, Gympie, &c. There has been talk of erecting Northern Queensland into a separate colony. Pop. in 1891, 393,718, estimated at end of 1895, 460,550.

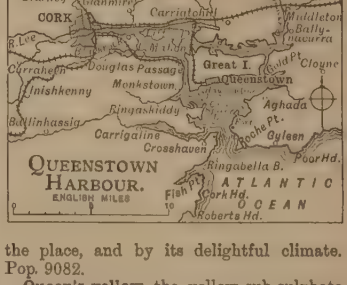
Queen's Metal. See *Britannia Metal.*

Queen's-pigeon, a magnificent ground-pigeon inhabiting the islands of the Indian Ocean, named after Queen Victoria. It is one of two species constituting the genus *Goura* (*G. Victoriæ*), and is the largest and most beautiful species of the order.

Queen's Speech, a document prepared by the queen's advisers (*i.e.* the cabinet), and read by her from the throne in the House of Lords, or in her absence by the lord chancellor, at the opening and closing of each session of parliament, in which, in the first case, she sets forth the general relations of the empire, and the measures her ministers intend to bring forward, and, in the latter, thanks the members of both houses for their diligent attention to business.

Queen's Tobacco-pipe, the name popularly given to a furnace in London, situated in the north-east corner of the tobacco warehouses belonging to the London Docks; so called because it was used for burning all sorts of contraband or smuggled articles seized by the custom-house officers, but especially tobacco and cigars.

Queenstown, formerly Cove of Cork, a maritime town of Ireland, and an important naval station, 9 miles south-east of Cork, on the south side of Great Island, which rises abruptly out of Cork harbour to a considerable elevation. The streets rise above one another and present a very picturesque appearance. Queenstown is defended by fortifications on Spike Island and at the entrance of the harbour, which is large and well sheltered. It is the port for the transmission of American mails, and a chief emigration station. It has little trade and no manufactures, being almost solely dependent on the military and naval establishments in its vicinity, and on the numerous visitors attracted by the singular beauty of



the place, and by its delightful climate. Pop. 9082.

Queen's-yellow, the yellow sub-sulphate of mercury, used as a pigment.

Quelpart, a rock-bound island, 60 miles long by 17 broad, off the south coast of Corea, of which it is a penal settlement. The soil is fertile, the climate temperate, and there is a large population. The interior is mountainous, and one summit, the volcanic Mount Auckland, is 6500 feet high.

Quentin, ST. (saṇ kán-taṇ), an ancient town of France, dep. of Aisne, on a height above the Somme, 87 miles N.E. of Paris, which from its position on the frontiers between France and the Low Countries figures much in history. It is well built, and has among its edifices a beautiful Gothic church (formerly a cathedral) of the early part of the 13th century, a Gothic town-house, with a façade resting on a colonnade of seven pointed arches, and forming a fine specimen of the flamboyant architecture of the 15th century. The staple manufactures are cotton and woollen goods. The environs are covered with bleachfields. The French were signally defeated here in 1557 by the Spaniards and a body of English auxiliaries, the town being afterwards taken and sacked. In Jan. 1871 the French were driven out of the town by the Germans after a sanguinary struggle. Pop. 45,838.

Quérard (kā-rär), JOSEPH MARIE, a French bibliographer, born at Rennes 1791, died at Paris 1865. He is author of La France Littéraire, in which he gives a complete bibliography of France for the 18th and the beginning of the 19th century; La Littérature Française Contemporaine 1827–49; and other bibliographical works.

Quer'citron, the internal bark of the *Quercus tinctoria,* a species of oak used for tanning leather and dyeing yellow.

Quercus. See *Oak.*

Querétaro (ke-rā'tā-rō), a city in Mexico, capital of the state of the same name, on a plateau 6365 feet above sea-level, 110 miles north-west of Mexico. Among the more noteworthy public edifices are the principal church, a magnificent and richly-decorated structure, and an aqueduct about 2 miles long, with arches 90 feet high, and by communicating with a tunnel in the opposite hills, bringing a copious supply of water from a distance of 6 miles. Maximilian of Austria was made prisoner and executed here 1867. Pop. 27,560. — The state of QUERÉTARO has an area of 3207 sq. miles, and forms part of the central plateau of the Cordillera, presenting a very rugged surface, traversed by mountain spurs and lofty heights. Grain and cattle form the chief wealth of the state. The minerals are comparatively unimportant. Pop. 203,250.

Querimba Islands, a chain of low coralline islands extending along the east coast of Africa, and comprised in the Portuguese territory of Mozambique. There is a town and fort on the chief of them, Ibo.

Quern, a hand-mill for grinding corn, such as is or has been in general use among various primitive peoples. The simplest and most primitive form of the quern is that in which a large stone with a cavity in the upper surface is used to contain the corn, which is pounded rather than ground with a small stone. The most usual form consists of two circular flat stones, the upper one pierced in the centre, and revolving on a wooden or metal pin inserted in the lower. In using the quern the grain is dropped with one hand into the central opening, while with the other the upper stone is revolved by means of a stick inserted in a small opening near the edge. Hand-mills of this description are used in parts of Scotland and Ireland to the present day.

Quesnay (kā-nā), FRANÇOIS, a French physician of some eminence, but chiefly noted as a writer on political economy, born in 1694, died in 1774. He was appointed surgeon in ordinary to the king, and subsequently, having taken the degree of M.D., physician to Madame de Pompadour, the mistress of Louis XV., who afterwards got him appointed physician to the king. He was the author of various surgical and medical works; of several articles in the Encyclopédie, in which he expounds his economical views; and tracts on politics, including a treatise on the Physiocratic System (1768).

Quesnel (kā-nel), PASQUIER (PASCHASIUS), a theologian and moralist, born at Paris in 1634, died at Amsterdam 1719. He became a member of the order of the Fathers of the Oratory in 1657, at that time a great nursery of Jansenism, and wrote a number of devotional works, one of the most important of which was Réflexions Morales sur le Nouveau Testament, consisting of thoughts on some of the most beautiful maxims of the evangelists. This work brought him under suspicion of the church on account of its Jansenistic tendencies, and latterly he had (1685) to quit French territory altogether. Going to Brussels, he there applied himself to the continuation of his work on the New Testament, which was published entire in 1693–94. In this some leading points in R. Catholicism were freely questioned. Bossuet and Noailles, archbishop of Paris, rather approved of the book; but the Jesuits obtained from Pope Clement XI. a bull condemning 101 of Quesnel's propositions as heretical. This bull, the notorious Unigenitus (promulgated in 1713), not only stirred up the Jansenists (see *Jansenists*), but awoke bitter dissensions in the bosom of the Gallican Church. Meantime Quesnel had been compelled to seek refuge (1703) in Holland, where he resided for the rest of his life.

Quetelet (kāt-lā), LAMBERT ADOLPHE JACQUES, Belgian statistician and astronomer, born at Ghent in 1796, studied at the lyceum of his native town, where, in 1814, he became professor of mathematics. In 1819 he was appointed to the same chair in the Brussels Athenæum. In 1828 he became lecturer in the Museum of Science and Literature, holding the post till 1834, when the institution was merged in the newly-established university. Quetelet superintended the erection of the Royal Observatory, and became its first director (1828). A member of the Belgian Royal Academy, he became its perpetual secretary in 1834. Quetelet's writings on statistics and kindred subjects are very numerous. He also published many papers on meteorology, astronomy, terrestrial magnetism, &c. Died 1874.

Quetta, a town of Beloochistan, strategically important as being at the entrance to the Bolan Pass, and on the road from Candahar through the Pishin Valley to Shikarpoor on the Indus. It thus commands the

southern route from India to Afghanistan. By treaty with the Khan of Kelat (1877), in whose territory it was, Quetta was furnished with a British garrison and strongly fortified. It contains extensive magazines of war material, and has for some time been connected with the Indian railway system. Quetta lies 5500 feet above the sea-level, and is surrounded by mountains from five to six thousand feet higher. Pop. 27,270.

Quetzalcoatl, the god of the air of the ancient Mexicans, who presided over commerce and the useful arts, and is said to have predicted the coming of the Spaniards to Mexico.

Quevedo y Villegas (ke-vā′dō ē vil-yā′gäs), Don Francisco de, a Spanish poet and prose writer, was born at Madrid in 1580, died 1645. In consequence of a duel, in which his adversary fell, he fled to Italy, where his services gained him the confidence and friendship of the Duke of Ossuna, viceroy of Naples. After having visited Germany and France Quevedo returned to Spain, and on account of his connection with the duke, then in disgrace, he was arrested and confined to his estate, La Torre de Juan, for three years (1620–23). After his liberation he lived for some years in retirement, occupying himself in writing political satires, burlesque poems, and pamphlets, which obtained an extraordinary degree of success. A second long imprisonment for his satirical writings completely shattered his health, and he died soon after his liberation. His humorous productions are distinguished for playfulness, wit, and invention. His prose works are mostly effusions of humour and satire. His Visions (Sueños) have been translated into most European languages; his Vida del Gran Tacaño is a comic romance of the sort called *picaresque*. He also translated the Enchiridion of Epictetus into Spanish.

Quezal, a most beautiful Central American bird of the Trogon family (*Trogon* or *Calurus resplendens*). It is about the size of a magpie, and the male is adorned with tail-feathers from 3 to 3½ feet in length, and of a gorgeous emerald colour. These feathers are not strictly speaking the true tail-feathers (the colour of which is black and white), but are the upper tail coverts of the bird. The back, head (including the curious rounded and compressed crest), throat, and chest are of the same rich hue, the lower parts being of a brilliant scarlet. The female wants these long feathers, and is otherwise much plainer. The food of the quezal consists chiefly of fruits. It lives in forests of tall trees. There are several

Quezal (*Trogon resplendens*).

allied species of birds, but none with the distinctive feature of the quezal.

Quezaltenan'go, a town of Central America, in Guatemala, capital of a department of same name, with woollen manufactures and a considerable trade. It was founded by Alvarado in 1524. Pop. 22,000.

Quibdo′, a town in the state of Cauca, of the Republic of Colombia, S. America, on the Alvalo. Pop. 6856.

Quiberon (kēb-roŋ), a peninsula, a bay, and a small fishing town on the west coast of France, dep. Morbihan. Here in 1759 Admiral Hawke gained a great victory over a French fleet. In 1795 a body of French royalists was landed here by an English fleet, but were speedily cut off by General Hoche.

Quibor (kē′bor), a town of Venezuela, in the State of Lara, division Barquisimeto. Pop. 7727.

Quichua (kē′chŋ-à), the name of a native race of South America, inhabiting Peru, parts of Ecuador, Bolivia, &c. With the Aymaras the Quichuas composed the larger portion of the population of the empire of the Incas. The Quichua language, which was formerly the state language of the Incas, is still the chief speech of Peru, of a large portion of Bolivia, of the part of Ecuador bordering upon Peru, and of the northern section of the Argentine Republic. It is one of the most beautiful and at the same time comprehensive tongues of America.

Quick-firing Guns, a type of ordnance of recent introduction, consisting of breech-loading guns of comparatively small size, the projectile and powder for which are combined together in a metallic cartridge-case, so that loading and firing are thus facilitated. They are mounted on special carriages provided with steel shields to protect the gunners, are fitted with special gear for handling and aiming, and are fired by electricity.

Quick Grass, Quitch Grass, or Quickens. See *Couch Grass*.

Quick (or Quickset) **Hedge**, a live hedge of any kind, especially one of hawthorn.

Quicklime. See *Lime*.

Quicksand, a large mass of loose or moving sand mixed with water formed on many sea-coasts, dangerous to persons who trust themselves to it and find it unable to support their weight.

Quicksilver. See *Mercury*.

Qui'etism, a religious movement in the R. Catholic Church at the close of the 17th and beginning of the 18th centuries, largely of a mystic character. It owed its origin to such works as the Spiritual Guide, of Molinos, in which the devout were taught, by contemplation, to bring the soul into direct union with the Godhead, and so receive the infused heavenly light. The most noted promoter of Quietism in France was Madame Guyon (which see). Fénelon became the advocate of Madame Guyon and her writings in his Explication des Maximes des Saints sur la Vie intérieure (1697). Bossuet obtained (1699) a papal brief which condemned twenty-three positions from Fénelon's book as erroneous; but the humility with which the latter submitted deprived his enemies of the fruits of their victory; and it was the change in the spirit of the times and not violence that gradually buried Quietism in oblivion.

Quillaı-bark (*Quillaia Saponaria*), the bark of a South American tree belonging to the wing-seeded section of the Rosaceæ. It is used to make a lather instead of soap in washing silks, woollens, &c. It is called also *Quillaya-bark*.

Quillimane (kil-i-mā'ne), a town in East Africa, in the Portuguese territory of Mozambique, unhealthily situated about 15 miles above the mouth of a river of the same name (the northern branch of the Zambesi). It carries on a considerable trade in gold, ivory, wax, &c., and coal of good quality is reported to be plentiful. Pop. 3500.

Quillota (kil-yō'tà), a town in Chili, in the province of Aconcagua, 23 miles north-east of Valparaiso. The copper-mines in the vicinity are regarded as the richest in Chili. The town has suffered severely on different occasions from earthquakes. Pop. 12,000.

Quills, the large wing-feathers of birds, and in a narrower sense the shafts or barrels of these. The principal use of quills is still for making pens, although they have been largely superseded by steel and other metals for this purpose. The best quills for pens are those of the swan, but goose-quills are most commonly used. Crow-quills are used for fine writing and pen-and-ink drawing. (See *Pen*.) Quills are also used for making brushes, artificial flowers, imitative horse-hair work, and a number of other articles, and the feather-ends have even been woven into fine tissues.

Quiloa (kēl'o-à), or Kilwa, a seaport of East Africa on the Zanzibar coast. Pop. 6000.

Quilon', a coast town in Madras, India, in the state of Travancore, 35 miles north-west of Trivandrum the capital, with a considerable export trade. It has a barrack for European troops, a hospital, and an Episcopal church. Pop. 13,588.

Quilting, a method of sewing two pieces of silk, linen, or stuff on each other, with wool or cotton between them, by working them all over in the form of chequer or diamond work, or in flowers.

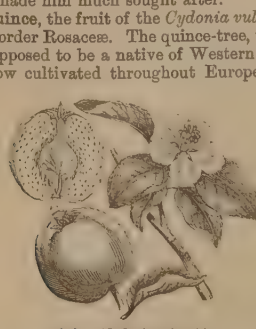
Quimper (kaṇ-pār), a town and port in France, capital of the department of Finistère, 4 miles south-east of Brest, at the head of the estuary of the Odet, an old town partly surrounded with walls flanked by towers. The principal edifices are a fine Gothic cathedral (1239–1493); the ruins of a Cordelier church and cloister; the college, the prefecture, military hospital, &c. The manufactures are earthenware, leather, cordage, &c. The sardine fishery forms an important occupation. Pop. 14,606.

Quimperlé (kaṇ-pār-lā), a town of France, dep. Finistère, beautifully situated among hills at the confluence of the Isole and Ellé. Pop. 6500.

Quin, James, an eminent actor, of Irish parentage, born in London in 1693, died at Bath 1766. He made his first appearance on the stage at Dublin in 1714; shortly afterwards he obtained an engagement in London, and gradually acquired celebrity as a tragic actor as well as in characters of

comic and sarcastic humour, like Falstaff, Volpone, &c. He retained his pre-eminence until the appearance of Garrick in 1741. His last performance was Falstaff (1753), in which character he is supposed never to have been excelled. He spent his latter years at Bath, where his fund of anecdote and pointed wit made him much sought after.

Quince, the fruit of the *Cydonia vulgāris*, nat. order Rosaceæ. The quince-tree, which is supposed to be a native of Western Asia, is now cultivated throughout Europe, and



Quince (*Cydonia vulgaris*).

in many parts of the United States, for its handsome golden yellow fruit, which, though hard and austere when plucked from the tree, becomes excellent when boiled and eaten with sugar, or preserved in syrup, or made into marmalade.

Quincey, Thomas de. See *De Quincey*.

Quincunx, an arrangement of five objects in a square, one at each corner and one in the middle, thus ⁘.

Quincy, the name of two towns and several villages in the United States. (1) A town in Adams county, Illinois, on the left bank of the Mississippi, 105 miles north-west of St. Louis. It is an important railway centre; has an extensive river traffic, and various manufacturing establishments, including tobacco manufactories, foundries, machine-shops, saw and flour mills, and an extensive and rapidly increasing trade. Pop. 31,494. (2) A town in Norfolk county, Massachusetts, on a branch of Boston harbour, about 7 miles from Boston. Its most important and lucrative industry is the working of the quarries which furnish the well-known Quincy granite. The fisheries also are important, and a considerable number of vessels are fitted out in the building-yards. Pop. 16,723.

Quincy, Josiah, an American writer, born at Boston 1772, died 1864. Educated for the law, he made politics his profession, and was a member of congress from 1804 to 1812. Then he was elected a member of the senate of the legislature of Massachusetts, a position which he held till 1821, in which year he held the office of speaker of the house. From 1823 to 1828 he was mayor of Boston and effected various important reforms. From 1829 to 1845 he was president of Harvard College. His principal works are History of Harvard University; Municipal History of the Town and City of Boston during Two Centuries; Life of John Quincy Adams.

Quinet (kē-nā), Edgar, a French philosopher, poet, historian, and politician, born 1803, died 1875. He first attracted attention by a translation of Herder's Philosophie der Geschichte in 1825. In 1828 he accompanied a scientific commission to the Morea; and in 1839 he became professor of foreign literature at Lyons, a position he changed in 1841 for a similar chair in the College of France. In consequence of the strongly democratic tone of the lectures delivered there from 1843 to 1846, his class-room was in the latter year closed by the government, and was not reopened till after the revolution of 1848. After the election of Napoleon as president Quinet was expelled from France, and refusing all Napoleon's amnesties, his exile lasted till after the revolution of 1870. His works, which number about thirty volumes, include poems, dramas, histories, religious mystical books, &c.

Quin'ine ($C_{20}H_{24}N_2O_2$), a white, crystalline alkaloid substance, inodorous, very bitter, and possessed of marked antifebrile properties. It is obtained from the bark of several trees of the order Cinchonaceæ (see *Cinchona*), but perhaps the best is that from calisaya bark. It was discovered about 1820, and has entirely superseded the use of the bark itself in medicine, being most commonly used in the form of sulphate of quinine. The extraordinary value of quinine in medicine as a febrifuge and tonic has given rise to a large trade in Peruvian bark, and has caused the cinchona tree to be extensively planted in India and elsewhere. Quinine in small doses is stomachic, in large doses it causes extreme disturbance of the nerves, headache, deafness, blindness, paralysis, but seldom death.

Quinoa (kwi-nō'a), a South American plant (*Chenopodium Quinoa*), of which there are two cultivated varieties, one yielding white seeds, and sometimes called petty-

rice, the other red. The white seeds are extensively used in Chili and Peru as an article of food in the form of porridge, cakes, &c. The seeds of the other variety, *red quinoa*, are used medicinally as an application for sores and bruises.

Quinquagesima, name of the Sunday before Lent, because fifty days before Easter.

Quinsy, the common name for *cynanchē tonsillaris* or *tonsillitis*, inflammation of the tonsils. The inflammation is generally ushered in by a feeling of uneasiness in the part. The voice is thick, and there is often swelling of the glands of the neck, with loss of appetite, thirst, headache, and a considerable degree of general fever. The tonsils, uvula, and even the soft palate are swollen and vascular, and the tongue is foul and furred. In severe cases respiration is considerably impeded, and swallowing is always difficult and painful. The inflammation of the throat may terminate either in resolution or suppuration. The most frequent cause of quinsy is cold, produced by sudden changes of temperature. But in a great many cases it will be found that the patient has been predisposed to the disease, owing to a bad state of the digestive organs. The best treatment to ward off an attack is to administer a dose of some strong purgative saline medicine. Bland soothing drinks should be given during the course of the disease, and sucking small pieces of ice gives much relief.

Quintain, a figure or other object set up

Ancient Quintain at Offham, Kent.

to be tilted at with a lance. It was constructed in various ways; a common form in England consisted of an upright post, on the top of which was a horizontal bar turning on a pivot; to one end of this a sand-bag was attached, on the other a broad board; and it was a trial of skill to tilt at the broad end with a lance, and pass on before the bag of sand could whirl round and strike the tilter on the back.

Quintal, a weight of 100 lbs. or thereby, used in different countries. The old French quintal was equal to 100 livres, or nearly 108 lbs. avoirdupois. The *quintal métrique* or modern quintal is 100 kilogrammes, or 220 lbs. avoirdupois.

Quintana (kin-tá'ná), Manuel José, Spanish poet, born at Madrid in 1772, died 1857. He studied at Cordova and Salamanca, became an advocate, and filled various offices connected with government at different times. Almost all the manifestoes in the war against the French were composed by him; he also wrote a series of patriotic poems, entitled Odas a España Libre. He was latterly appointed director-general of education, and became a senator. His poetical, critical, and historical works are held in high estimation.

Quintet' (Italian, *quintetto*), a vocal or instrumental composition in five parts, in which each part is obligato, and performed by a single voice or instrument.

Quintil'ian, Marcus Fabius Quintilianus, a Roman rhetorician, born at Calagurris (Calahorra) in Spain, probably between 35 and 40 A.D.; died about 118. He began to practise as an advocate at Rome about A.D. 69, and subsequently became a teacher of rhetoric. Some of the most eminent Romans were his pupils, and the Emperor Domitian bestowed on him the consular dignity. His work, De Institutione Oratoria, contains a system of rhetoric in twelve books, and includes some important opinions of Greek and Roman authors.

Quintus Cal'aber, or Smyrnæ'us, a Greek poet, author of a sort of continuation of the Iliad in fourteen books, a rather dull imitation of Homer. He probably flourished at Smyrna in the 4th century A.D.

Quintus Curtius. See *Curtius.*

Quipo, Quipu (kwip'o, kwip'ó), a cord about 2 feet in length, tightly spun from variously coloured threads, and to which a number of smaller threads were attached in the form of a fringe: used among the ancient Peruvians and Mexicans for recording events, &c. The fringe-like threads were also of different colours and were knotted.

The colours denoted sensible objects, as white for silver, yellow for gold, and the like; and sometimes also abstract ideas, as white for peace, red for war. They constituted a rude register of certain important facts or events, as of births, deaths, and marriages, the number of the population fit to bear arms, the quantity of stores in the government magazines, &c.

Quire (French, *cahier*), twenty-four sheets of paper. Twenty quires make a *ream*.

Quirinal, one of the seven hills of ancient Rome. There is a palace here, begun in 1574, and formerly a summer residence of the popes, but since 1871 the residence of the King of Italy. See *Rome*.

Quiri'nus, among the Romans, a surname of Romulus after he had been raised to the rank of a divinity. Hence *Quirinalia*, a festival in honour of Romulus, held annually on the 13th day before the Kalends of March, that is, the 17th of February.

Quiri'tes, a designation of the citizens of ancient Rome as in their civil capacity. The name of Quirites belonged to them in addition to that of Romani, the latter designation applying to them in their political and military capacity.

Quirk Moulding, or QUIRKED MOULDING, in architecture, a moulding whose sharp and sudden return from its extreme projection to the re-entrant angle seems rather to partake of a straight line on the profile than of the curve.

Quit-claim, in law, signifies a release of any action that one person has against another. It signifies also a quitting of a claim or title to lands, &c.

Quito (kē'tō), the capital of Ecuador, in a ravine on the east side of the volcano of Pichincha, 9348 feet above the sea, a little to the south of the equator. Its streets, with exception of four which meet in the large central square, are narrow, uneven, badly paved, and extremely dirty. The more important public buildings are the cathedral, several other churches and convents; the town-house, court-house, president's palace, the university, the episcopal palace, orphan asylum, and hospital. The manufactures consist chiefly of woollen and cotton goods. From the want of good roads and railways trade is much hampered. Quito was originally the capital of a native kingdom of the same name, but the modern town was founded by the Spaniards in 1534. It has repeatedly suffered from earthquakes. Pop. about 80,000, largely consisting of half-breeds and Indians.

Quit-rent, in law, a small rent payable by the tenants of most manors, whereby the tenant goes quit and free from all other services.

Quittah, a town on the coast of W. Africa, in the British colony of the Gold Coast. Pop. 5000.

Quoits, a game played with a flattish ring of iron, generally from 8¼ to 9½ inches in external diameter, and between 1 and 2 inches in breadth. It is convex on the upper side and slightly concave on the under side, so that the outer edge curves downwards, and is sharp enough to cut into soft ground. The game is played in the following manner:—Two pins, called hobs, are driven into the ground from 18 to 24 yards apart; and the players, who are divided into two sides, stand beside one hob, and in regular succession throw their quoits (of which each player has two) as near the other hob as they can, giving the quoit an upward and forward pitch with the hand and arm, and at same time communicating to it a whirling motion so as to make it cut into the ground. The side which has the quoit nearest the hob counts a point towards game, or if the quoit is thrown over the hob, it counts two.

Quorra, a name given to the lower portion of the Niger (which see).

Quorum, a term used in commissions, of which the origin is the Latin expression, *quorum unum A. B. esse volumus* ('of whom we will that A. B. be one'), signifying originally certain individuals, without whom the others could not proceed in the business. In legislative and similar assemblies a quorum is such a number of members as is competent to transact business.

Quotidian Fever. See *Ague*.

R.

R is the eighteenth letter of the English alphabet, classed as a liquid and semi-vowel. In the pronunciation of Englishmen generally it represents two somewhat different sounds. The one is heard at the beginning of words and syllables, and when it is preceded

by a consonant; the other, less decidedly consonantal, is heard at the end of words and syllables, and when it is followed by a consonant. In the pronunciation of many English speakers, *r*, followed by a consonant at the end of a syllable, is scarcely heard as a separate sound, having merely the effect of lengthening the preceding vowel; when it is itself final, as in *bear, door, their*, &c., it becomes a vowel rather than a consonant. —*The three Rs*, a humorous and familiar designation for *Reading, Writing*, and *Arithmetic*. It originated with Sir William Curtis, who, on being asked to give a toast, said, 'I will give you *the three Rs, Writing, Reading*, and *Arithmetic*.'

Ra (more properly Rê), the name of the god of the sun among the ancient Egyptians. He is represented, like Horus, with the head of a hawk, and bearing the disk of the sun on his head. *Tum, Harmachis*, and other gods are mere impersonations of the various attributes of Ra.

Raab (räb), or GYÖR (dyeur), a town in Hungary, at the confluence of the Raab and Rabnitz with the Danube, 67 miles W.N.W. of Buda. It is the see of a Roman Catholic bishop, and has a fine cathedral, an episcopal palace, diocesan seminary, &c. Its manufactures are woollen cloth, cutlery, and tobacco. Pop. 20,981.

Raasay, or RASAY, an island in Scotland, one of the Inner Hebrides, between Skye and the mainland, about 13 miles long north to south, and 2 miles broad at the widest part. It is for the most part a hilly ridge, rising in parts to over 1000 feet. There are some scattered farms on the east side of the island. Pop. 438.

Rabat', a maritime town in Marocco, in the province of Fez, on the Atlantic, at the mouth of the Buregreb, is surrounded with a wall flanked by numerous towers, and has a citadel and batteries. It has some manufactures (carpets, woollens, cottons, and leather) and considerable trade in wool and corn. Pop. 30,000. On the other side of the river mouth is the town of Sallee.

Rabba, a town of the Western Soudan, in the Kingdom of Gando, on the left bank of the Niger, some 350 miles from its mouth, with a considerable trade in slaves and ivory, and manufactures of woollen. Pop. said to be about 40,000.

Rabbet, in carpentry, a sloping cut made on the edge of a board so that it may join by lapping with another board similarly cut; also, a rectangular recess, channel, or groove cut along the edge of a board or the like to receive a corresponding projection cut on the edge of another board, &c., required to fit into it.

Rabbi, a title of honour among the Hebrews, corresponding nearly to the English *master*. There are two other forms of the title, *rabboni* and *rabbani*, the former of which is found in the New Testament. It is supposed that this title first came into use at the period immediately preceding the birth of Christ. In the time of our Lord it was applied generally to all religious teachers, and hence sometimes to Christ himself. Now the term rabbi or rabbin is applied to regularly appointed teachers of Talmudic Judaism.

Rabbinic Hebrew, that form of Hebrew in which the Jewish scholars and theologians of the middle ages composed their works. Grammatically it differs but little from the ancient Hebrew, but in many cases new meanings are attached to Hebrew words already in use, in other cases new derivatives are formed from old Hebrew roots, and many words are borrowed from the Arabic. The rabbinical literature is rich and well repays study.

Rabbit (*Lepus cunicŭlus*), a genus of rodent mammals, included in the family Leporidæ, to which also belong the hares. It is of smaller size than the hare, and has shorter ears and hind legs. The rabbit's fur in its native state is of a nearly uniform brown colour, whilst under domestication the colour may become pure white, pure black, piebald, gray, and other hues. The texture of the fur also changes under domestication. The rabbit is a native of all temperate climates, and in its wild state congregates in 'warrens' in sandy pastures and on hill-slopes. Rabbits breed six or seven times a year, beginning at the age of six months, and producing from five to seven or eight at a birth. They are so prolific that they may easily become a pest as in Australia, if not kept in check by beasts and birds of prey. They feed on tender grass and herbage, and sometimes do great damage to young trees by stripping them of their bark. They grow exceedingly tame under domestication, and sometimes exhibit considerable intelligence. Rabbits are subject to certain diseases, such as rot—induced probably by damp and wet —parasitic worms, and a kind of madness. The skin of the rabbit is of considerable value; cleared of hair, it is used with other skins to make glue and size. The fur is

employed in the manufacture of hats, and to imitate other and more valuable furs, as ermine, &c.

Rabelais (rȧb-lā), FRANÇOIS, a humorous and satirical French writer, born in or before 1495, the son of an apothecary of Chinon, in Touraine. He entered the Franciscan order at Fontenay-le-Comte, in Poitou, and received the priesthood. His addiction to profane studies appears to have given offence to his monastic brethren, and through the influence of friends he obtained the permission of Clement VII. to enter the Benedictine order (about 1524). He then exchanged the seclusion of the monastery for the comparative freedom of the residence of the Bishop of Maillezais, who made him his secretary and companion. In the course of a few years we find him at Montpellier, where he studied medicine, having by this time become a secular priest; he was admitted bachelor in 1530, and for some time successfully practised and taught. In 1532 he went to Lyons, where he published a work of Hippocrates and one of Galen, and the first germ of his Gargantua (1532 or 1533). The first part of his Pantagruel appeared under the anagram of Alcofribas Nasier, within a year or so after the former work, and its success was such that it passed through three editions in one year. Soon after its publication Rabelais accompanied Jean du Bellay on an embassy to Rome. On his return to France he went first to Paris; but not long after he is found once more at Lyons, where the Gargantua, as we now have it, first saw the light (1535). The Gargantua and Pantagruel together form a single work professing to narrate the sayings and doings of the giant Gargantua and his son Pantagruel. In 1536 Rabelais was again at Rome, and on this occasion he obtained from the pope absolution for the violation of his monastic vows, and permission to practise medicine and to hold benefices. Shortly afterwards he was granted a prebend in the abbey of Saint Maur-des-Fossés by Jean du Bellay. In 1537 he took his degree of Doctor of Medicine at Montpellier, and lectured on Hippocrates. The next few years were as unsettled as regards his abode as any previous period of Rabelais' life, and it is difficult to follow him. Probably he was in Paris in 1546, when the third book of his Gargantua and Pantagruel appeared, but during most of 1546 and part of 1547 he was physician to the town of Metz. In the third book all the great moral and social questions of the day were discussed with the gaiety and irony peculiar to Rabelais, and with a freedom that roused the suspicion of the clergy, who endeavoured to have it suppressed. The favour of the king secured its publication, but it was with more difficulty that a license was obtained for the fourth book from Henry II., who had succeeded Francis in 1547. This book did not appear complete till 1552. About 1550 Rabelais was appointed to the cure of Meudon, but he resigned the position in 1552, and died a year later according to most authorities. He left the whole of the fifth book of his remarkable romance in manuscript. By many Rabelais has been set down as a gross buffoon, and there is much in his writings to justify the harsh judgment, though we must remember what was the taste of his times. As regards the purpose of his work, many have looked upon Rabelais as a serious reformer of abuses, religious, moral, and social, assuming an extravagant masquerade for the purpose of protecting himself from the possible consequences of his assaults on established institutions. The earlier books were translated into English by Sir Thos. Urquhart (1653), who found a continuator in Motteux. There are also translations into German and Italian.

Rabies (rā'bi-ēz), the name given to a disease, probably a kind of blood-poisoning, with which dogs, horses, cats, wolves, and other animals are attacked, and to which, indeed, all animals are said to be liable. A bite from some rabid animals induces hydrophobia in man. See *Hydrophobia*.

Racalmu'to, a town of Sicily, in the province of Girgenti, with mines of sulphur, salt, and quicksilver. Pop. 13,434.

Raccahout (rak'ka-hōt), a starch or meal prepared from the edible acorn of the Barbary oak (*Quercus Ballōta*), sometimes recommended as food for invalids. Mixed with sugar and aromatics it is used by the Arabs of Northern Africa as a substitute for chocolate.

Raccoon'. See *Racoon*.

Race-horse, a horse bred or kept for racing or running in contest, called also a *Blood-horse* and a *Thorough-bred Horse*. The English race-horse, though far inferior to the Arab in point of endurance, is perhaps the finest horse in the world as regards speed for a moderate distance. It is of Arabian, Berber, or Turkish extraction, improved and perfected by the influence of the climate, and by careful crossing.

Raceme, in botany, a form of inflorescence in which the primary axis is elongated, and bears flowers placed on pedicels of nearly equal length, as in the currant and lily-of-the-valley. The inflorescence is centripetal or indefinite. It differs from a spike only in the flowers not being sessile. See *Inflorescence*.

Rachel (rà-shell), MADEMOISELLE (ELIZABETH RACHEL FELIX), a French *tragédienne*, of Jewish extraction, born in 1821; died in 1858. For a time she gained her living by singing in the streets of Lyons, but being taken notice of she was enabled to receive a course of instruction at the Conservatoire, and made her *début* in 1837 on the stage of the Gymnase at Paris. She attracted no special attention, however, until the following year, when, transferred to the Théâtre Français, she took the Parisian public by storm by the admirable manner in which she impersonated the classic creations of Racine and Corneille. Her reputation was speedily established as the first tragic actress of her day. In 1841 she visited England, and was received with the greatest enthusiasm. Her renown continued to increase, and for many years she reigned supreme at the Théâtre Français, making also tours to the provincial towns of France, to Belgium, &c. Later she visited America, but when there caught a severe cold, which terminated in consumption. She was of a fierce and unlovable temper, destitute of moral principle, and very avaricious.

Rachis (rā'kis), in botany, a branch which proceeds nearly in a straight line from the base to the apex of the inflorescence of a plant. The term is also applied to the stalk of the frond in ferns, and to the common stalk bearing the alternate spikelets in some grasses.

Rachitis (ra-kī'tis), a term which properly implies inflammation of the spine, but it is applied to the disease called *Rickets*, which term suggested this as the scientific name.

Racine (ra-sēn'), a town in the United States, in Racine county, Wisconsin, on the west shore of Lake Michigan. It has a fine harbour, and enjoys considerable trade. It has iron-foundries, manufactures of machinery and agricultural implements; tanneries and flour-mills, and extensive railway-carriage works. Pop. 21,014.

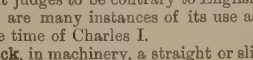
Racine (rà-sēn), JEAN BAPTISTE, a distinguished French dramatist, born at La Ferté-Milon (Aisne) 1639, died at Paris 1699. He was educated at Port-Royal, the famous Jansenist institution, and latterly at the Collége d'Harcourt. After writing an ode, called Nymphes de la Seine, in honour of the king's marriage, and two comedies, now lost, he made the acquaintance of Boileau and Molière, and began to write for the stage. His first tragedy, the Thébaïde, or Les Frères Ennemis, was performed by Molière's troupe at the Palais-Royal in 1664, as was also his next, Alexandre, in 1665. His first master-piece was Andromaque, which on its performance at the Hôtel de Bourgogne, in 1667, produced a profound impression. The immediate successor of Andromaque was Les Plaideurs (1668), a witty and delightful imitation of the Wasps of Aristophanes. His next pieces were Britannicus (1669); Bérénice (1670); Bajazet (1672); Mithridate (1673); Iphigénie (1674); Phèdre (1677), the last piece that Racine produced expressly for the theatre. In 1673 he obtained a seat in the French Academy. His withdrawal from the theatre in 1677 was partly due to chagrin at the success of a hostile party of theatrical critics who applauded a writer now never heard of at the expense of Racine. At this period his friends persuaded him to marry, and soon after (1678) he was appointed, along with Boileau, historiographer to the king, whom he accompanied in his campaign to Flanders. After a silence of twelve years Racine, at the solicitation of Madame de Maintenon, wrote two other pieces—Esther (1689) and Athalie (1691). His death is said to have been hastened by grief at losing the favour of the king. As a dramatist Racine is usually considered the model of the French classical tragic drama, and in estimating his powers in this field it is necessary to take into account the stiff conventional restraints to which that drama is subjected. What he achieved within these limits is extraordinary. Besides his dramas Racine is the author of epigrams, odes, and hymns, &c.

Racing. See *Horse-racing*.

Rack, an instrument for the judicial torture of criminals and suspected persons. It was a large open wooden frame within which the prisoner was laid on his back upon the floor, with his wrists and ankles attached by cords to two rollers at the end of the frame. These rollers were moved in opposite directions by levers till the body rose to a level with the frame; questions were then put, and if the answers were not deemed satisfactory, the sufferer was gradually

stretched till the bones started from their sockets. It was formerly much used by civil authorities in the cases of traitors and conspirators; and by the members of the Inquisition, for extorting a recantation from imputed heretical opinions. The rack was introduced into England in the reign of Henry VI., and although declared by competent judges to be contrary to English law, there are many instances of its use as late as the time of Charles I.

Rack, in machinery, a straight or slightly curved metallic bar, with teeth on one of

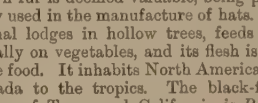


Rack and Pinion.

its edges, adapted to work into the teeth of a wheel or pinion, for the purpose of converting a circular into a rectilinear motion, or vice versa.

Rackets, or RACQUETS, a game played in a prepared court, open or close, with a small hard ball and a bat like that used for playing tennis. The close or roofed court is now generally preferred for playing in. It is an oblong rectangular area, 80 feet long and 40 broad when of full dimensions, and having high walls. The floor is divided into two chief areas of unequal size by a line, called the *short line*, drawn across it at two-fifths of the length of the court from the back wall, the smaller area being again divided into two equal parts by a line at right angles to this, and two small areas being marked off in the other space next the short line, called *service spaces*. Two horizontal lines are also drawn across the front wall, one 2 feet 2 inches above the floor, below which if a ball strike it is out of play, the other, the *cut line*, 7 feet 9 inches above the floor. The game may be played with either one or two persons on each side. It is decided by lot which side goes in first, and the first player assumes which side of the court he pleases (usually the right), while the other stands in the opposite corner. The first player then begins to *serve*, which consists in striking the ball with the bat so as to make it strike the front wall above the cut line, and then rebound into the opposite corner. If the ball is properly served the second player must strike it before it has made a second bound, so that it strikes the front wall above the lower line; but in returning the ball in this manner the player may if he likes first make it strike either of the side walls. The player may also return it before it touches the floor. The first player then returns the ball in the same way, and this goes on until either player fails. If it is the first player who fails, it is then the turn of the second player to serve. If it is the second player, the first scores one (an ace), and continues to serve, but goes to the opposite side of the court. In general fifteen is game.

Racoon', or RACCOON', an American plantigrade carnivorous mammal, the common racoon being the *Procyon lotor*. It is about the size of a small fox, and its grayish-brown fur is deemed valuable, being principally used in the manufacture of hats. This animal lodges in hollow trees, feeds occasionally on vegetables, and its flesh is palatable food. It inhabits North America from Canada to the tropics. The black-footed racoon of Texas and California is *P. Hermandezii*. The agouara or crab-eating racoon (*P. cancrivŏrus*) is found further south on the American continent than the above species, and is generally larger. Al-



Common Racoon (*Procyon lotor*).

though denominated 'crab-eating' it does not appear to be any more addicted to this dietary than the common species.

Radautz, a town of Austria, in the duchy of Bukowina, with a government stud of horses and manufactures of machinery, glass, paper, beer, and spirits. Pop. 11,162.

Radcliffe, a town in Lancashire, on the river Irwell, 7 miles N.W. of Manchester and 3 S.W. of Bury, does a considerable business in calico-printing, cotton-weaving, bleaching, &c., and has extensive collieries in its vicinity. Pop. 20,020.

Radcliffe, ANN WARD or, novelist, born in London in 1764, died 1823. She married at the age of twenty-three Mr. William Radcliffe, afterwards editor and proprietor of the English Chronicle newspaper. She published in quick succession The Castles of Athlin and Dunbayne, a Highland story; The Sicilian Romance; and The Romance of the Forest. Her master-piece is con-

sidered to be the Mysteries of Udolpho (1794), which was long very popular. The last of her novels published during her life was The Italian (1797). A posthumous romance, Gaston de Blondeville, was edited by T. N. Talfourd in 1826, together with some poetical pieces. Mrs. Radcliffe had considerable power in the description of scenery, and knew how to excite and maintain the curiosity of her readers; but her characters are insipid, the world in which they move is unreal, and the conclusion of her stories lame and impotent.

Radcliffe, JOHN, a celebrated medical practitioner, born in 1650 at Wakefield, in Yorkshire, and educated at Oxford. Having studied medicine, and taken the degree of M.B., he became in 1686 physician to the Princess Anne of Denmark, and was frequently consulted by King William. He attended Queen Mary in 1694 when she was attacked by small-pox, but was unable to save her. Rough and blunt in manner, he lost the good graces of Anne, and also of William, by his plain-speaking. In 1714, when the queen was seized with her last illness, he was sent for, but either could not or would not attend. This gave rise to great ill-feeling towards him. He died in 1714, leaving £40,000 to the University of Oxford for the foundation of a library of medical and philosophical works. See next article.

Radcliffe Library, a library founded in connection with Oxford University out of funds destined for the purpose by Dr. John Radcliffe, and opened in 1749. The building erected by the Radcliffe trustees for the reception of the books forming the library is now used as a reading-room in connection with the Bodleian Library. An observatory in connection with the university was founded in 1772 by the Radcliffe trustees.

Radeberg (rä'dé-ber*h*), a town in Saxony, 9 miles N.E. of Dresden, on the Roeder; has important manufactures of glass, paper, &c. Pop. 7387.

Radetz'ky, JOSEPH WENCESLAUS, COUNT, a famous Austrian soldier, born at Trebnitz, in Bohemia, in 1766; died 1858. Commencing his career in a Hungarian regiment of horse in 1784, he fought in most of the campaigns in which Austria was engaged from that date up to the time of his death, including Hohenlinden, Wagram, and Leipzig. But his most signal services were in Italy, whither he was called by the commotions following the French revolution of 1830, and where a great part of his subsequent life was spent. On the breaking out of the insurrection at Milan in March 1848, Radetzky maintained a fight for several days in the streets, and then retreated with his forces to Verona. On the Sardinian king Charles Albert taking the field he assumed the offensive, and after an arduous, and for a time doubtful campaign, gained the victory of Custozza (July 25), which compelled Charles Albert to retreat to Milan, and then evacuate the city after a short contest, thus preserving Lombardy to Austria. An armistice having been concluded with Sardinia he next occupied himself with the blockade of the revolted city of Venice, but hurried from it in March 1849, on the resumption of hostilities with Charles Albert. Assembling his army at Pavia he crossed the Ticino, and gained so decisive a victory at Novara, on 23d March, that the king abdicated in favour of his son Victor Emmanuel, and a treaty was concluded which secured for the time the Austrian supremacy in Italy. Venice surrendered to Radetzky in August of the same year. Radetzky had been made field-marshal in 1836, and other honours and rewards were now showered upon him. The remainder of his life was spent at Milan.

Radhanpur, a petty state of British India, in the N.W. of Gujerat, with an area of 1150 square miles. The state came under British protection in 1819. Pop. 98,129.—The capital of the state has the same name. Pop. 14,722.

Radia'ta, the name given by Cuvier to the fourth great division of the animal kingdom, including those animals whose parts are arranged round an axis, and display more or less of the 'rayed' appearance or conformation. In modern zoology Cuvier's division has been abolished, and the radiata have been divided into the Protozoa, Cœlenterata, and Annuloida or Echinozoa.

Radiation. See *Heat*.

Radical (from L. *radix*, root), the name adopted by a large section of the Liberal party in Britain, which desires to have all abuses in the government completely rooted out, and a larger portion of the democratic spirit infused into the constitution. The term was first applied as a party name in 1818 to Henry Hunt, Major Cartwright, and others, who wished to introduce radical reform in the representative system.

Radicles, or RADICALS, a name given in chemistry to certain groups of elements which remain united throughout many reactions. See *Chemistry*.

Radiola'ria, an order of Protozoa of the class Rhizopoda, characterized by possessing a central mass of sarcode inclosed in a porous, membranous, or chitinous capsule which is surrounded by a sarcode envelope. They often possess a siliceous or flinty test or siliceous spicules, and are provided with *pseudopodia*, or prolongations of their soft protoplasmic bodies, which stand out like radiating filaments, and occasionally run into one another. The Polycystina (which see) belong to the Radiolaria.

Radiom'eter, an instrument designed for measuring the mechanical effect of radiant energy. It consists of four crossed arms of very fine glass, supported in the centre by a needle-point having at the extreme end thin discs of pith, blackened on one side. The instrument is placed in a glass vessel exhausted of air, and when exposed to rays of light or heat the wheel moves more or less rapidly in proportion to the strength or weakness of the rays.

Radish (*Raphănus sativus;* natural order, Cruciferæ), a well-known cruciferous plant, unknown in a wild state, but cultivated in Britain since 1548. The tender leaves are used as a salad in early spring, the green pods are used as a pickle, and the succulent roots are much esteemed.

Ra'dius, the bone of the fore limb of vertebrate animals, which, as in man, when the arm is supinated or laid flat, with the palm upwards, lies to the thumb side of the limb. This side is therefore termed the *radial* side of the limb, in contradistinction to the *ulnar* or opposite side, so named from the ulna or neighbouring bone, which, with the radius, constitutes the fore-arm. See *Arm*.

Radius, in geometry. See *Diameter*.

Radius Vector, in astronomy, an imaginary straight line joining the centre of an attracting body, as the sun, with that of a body, as a planet, describing an orbit round it.

Radix (L., a root), in mathematics, any number which is arbitrarily made the fundamental number or base of any system of numbers. Thus 10 is the radix of the decimal system of numeration; also in Briggs's or the common system of logarithms, the radix is 10; in Napier's it is 2·7182818284. See *Logarithms*.

Radnor, or RADNORSHIRE, an inland county in South Wales; area, 276,552 acres. The surface throughout is hilly, the highest summit of the Forest of Radnor reaching an elevation of 2163 feet above sea-level. Oats and wheat are the principal crops, but the chief dependence of the farmer is on the stock reared on the pasture and commonlands, which support large numbers of sheep and cattle. The original Welsh ponies are still bred in the mountains. Large quantities of butter are made. The chief manufacture is flannel, but it is of no great extent. The county returns one member to parliament. Pop. 21,791.—The county town, NEW RADNOR, till 1885 a parliamentary borough (one of the Radnor district), is pleasantly situated on the river Somergill. Pop. 497.—OLD RADNOR is a village 3 miles distant.

Radom, a town in Russian Poland, on the Radomka, capital of the government of the same name. It has manufactures of oil, vinegar, and leather. Pop. 12,061.—The government has an area of 4768 square miles; forms the most elevated portion of the Polish plain; is much wooded; agriculture and cattle-raising the chief occupations of the inhabitants. Pop. 697,273.

Rae (rā), JOHN, M.D., LL.D., Arctic traveller, born in Orkney, 1813, studied medicine at Edinburgh, became surgeon in the Hudson Bay Company's service, 1833, and made several exploring expeditions through the North-west and to the Arctic coasts. He accompanied Sir John Richardson in his Franklin search (1848) in the Mackenzie and Coppermine region; conducted an expedition in 1851, and again in 1853–54, when his party discovered the first traces of Franklin's fate, for which he received the government grant of £10,000. He published Expedition to the Shores of the Arctic Sea in 1846–47 (1850). He died in 1893.

Raeburn, SIR HENRY, an eminent portrait-painter, born at Edinburgh in 1756. Bound apprentice to a goldsmith, he was no sooner free than he devoted himself to portrait-painting, and with the view of improving in his art repaired to London, afterwards spending two years in Italy. Returning in 1787, he established himself in Edinburgh, and soon rose to the head of his profession in Scotland. His portraits are distinguished by grasp of character, breadth of treatment, and excellent colour. He was knighted by George IV. in 1822, and died the following year.

Raff, JOACHIM, musical composer, born in Switzerland, of German parents, in 1822; died in 1882. He was encouraged by Mendelssohn and Liszt, and having gone in 1850 to live at Weimar, in order to be near Liszt,

his opera, König Alfred, was first performed there at the Court Theatre. His Dame Kobold, a comic opera, was produced in 1870, but his reputation rests chiefly on his symphonies (Im Wald, Lenore, &c.). He wrote also much chamber music of undoubted excellence. In 1877 he was appointed director of the Conservatoire at Frankfort, where he died. He was a supporter of the Wagner school in music.

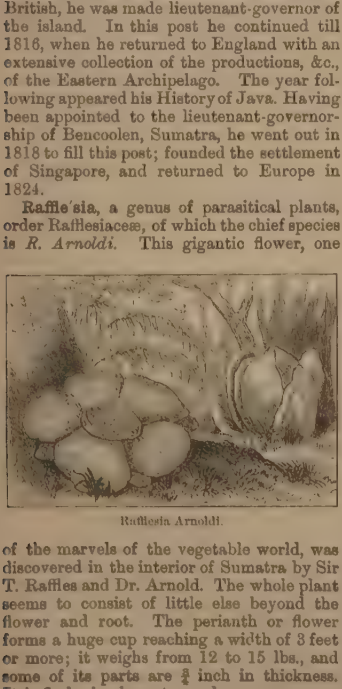
Raffael'lo. See *Raphael.*

Raffia. See *Raphia.*

Raffle, a game of chance, in which several persons each deposit part of the value of a thing for the chance of gaining it.

Raffles, Sir Thomas Stamford, English naturalist, born in 1781, died 1826. He entered the East India Company's civil service, and in 1811, on the reduction of Java by the British, he was made lieutenant-governor of the island. In this post he continued till 1816, when he returned to England with an extensive collection of the productions, &c., of the Eastern Archipelago. The year following appeared his History of Java. Having been appointed to the lieutenant-governorship of Bencoolen, Sumatra, he went out in 1818 to fill this post; founded the settlement of Singapore, and returned to Europe in 1824.

Raffle'sia, a genus of parasitical plants, order Rafflesiaceæ, of which the chief species is *R. Arnoldi.* This gigantic flower, one



Rafflesia Arnoldi.

of the marvels of the vegetable world, was discovered in the interior of Sumatra by Sir T. Raffles and Dr. Arnold. The whole plant seems to consist of little else beyond the flower and root. The perianth or flower forms a huge cup reaching a width of 3 feet or more; it weighs from 12 to 15 lbs., and some of its parts are ¾ inch in thickness. It is fleshy in character and appearance, remains expanded for a few days, and then begins to putrefy, having quite the smell of carrion, and thus attracting numerous insects.

Rafflesia'ceæ, a natural order of parasitical plants or rhizogens, the species of which are found in the East Indies, Java, Sumatra, &c., and in South America. The genus *Rafflesia* is the type. See *Rafflesia.*

Raft, a sort of float formed by a body of planks or pieces of timber fastened together side by side so as to be conveyed down rivers, across harbours, &c.; also any rough floating structure, such as those often formed in cases of shipwreck of barrels, planks, &c.

Rafters are pieces of timber which, resting by pairs on the side walls of a building, meet in an angle at the top, and form the main support of the roof.

Ragatz, a town of Switzerland, canton of St. Gall, situated at the junction of the Tamina with the Rhine, 1700 feet above the sea, and connected by railway with Zürich and Coire. It is much resorted to both for its beautiful scenery and its mineral waters. Pipes are laid from Pfäffers, 2½ miles higher up, by which the water is brought down from the hot springs there to a spacious bathing establishment without losing its high temperature. The permanent population is only about 2000, but there is a large number of visitors, for the accommodation of whom large hotels, restaurants, &c., have been provided. There is also a bathing establishment near the springs, erected in 1704. The temperature of the water is 97°–100°, and it is impregnated with carbonate of lime, magnesia, and salt. The village of Pfäffers lies 2 miles south of Ragatz at a height of 2696 feet.

Ragee (*ra-gē'*), Raggee, an Indian grain (*Eleusine coracāna*), very prolific, but probably the least nutritious of all grains. In the form of cake or porridge it is the staple food of the poorer classes in Mysore and on the Neilgherries.

Ragged Schools, institutions supported by voluntary contributions, which provide free education, and in many cases food, lodging, and clothing for destitute children, and so aid in preventing them from falling into vagrancy and crime. These schools differ from certified industrial schools in that the latter are for the reception of vagrant children and those guilty of slight offences; but the two institutions are frequently combined. The idea of forming such schools was due to a Portsmouth

cobbler, John Pounds, who about 1819 began to take in the ragged children of the district in which he lived and teach them while he was at work. The name of Dr. Guthrie of Edinburgh is prominent among those who developed this scheme of rescue.

Raghuvansa, the title of one of the most celebrated Sanskrit poems. Its subject is the legendary history of the solar kings, or kings descended from the sun.

Raglan, FITZROY JAMES HENRY SOMERSET, LORD, born 1788, youngest son of Henry, fifth duke of Beaufort, entered the army in 1804; was attached in 1807 to the Hon. Sir Arthur Paget's embassy to Turkey; and the same year served on Sir Arthur Wellesley's staff in the expedition to Copenhagen. He acted as military secretary to the latter during the Peninsular war, in which he greatly distinguished himself at the capture of Badajoz. At Waterloo he lost his right arm. From 1816 to 1819 he acted as secretary to the embassy at Paris; and from 1819 to 1852 as military secretary to the Duke of Wellington. In 1852 he was made master-general of the ordnance, and was elevated to the House of Peers as Baron Raglan. On the breaking out of the Crimean war he received the appointment of commander of the forces, and displayed much personal bravery as well as an amiable and conciliatory temper; but he had no great fitness for the position in which he was placed, and the repulse of the allies in their attack on the Redan, allied with other causes, aggravated the mild form of cholera from which he was suffering, and he expired June 28, 1855.

Ragman Roll, the name of the collection of those instruments by which the nobility and gentry of Scotland were constrained to subscribe allegiance to Edward I. of England in 1296, and which were more particularly recorded in four large rolls of parchment, consisting of thirty-five pieces sewed together, kept in the Tower of London.

Ragnarök (rag'na-rök), in Scandinavian mythology, literally twilight of the gods or doom of the gods, the day of doom when the present world will be annihilated to be reconstructed on an imperishable basis.

Ragout (ra-gü'; French, ragoût), meat or fish stewed with vegetables, and highly seasoned to excite a jaded appetite.

Rags, though valueless for most purposes, are yet of great importance in the arts, particularly in paper-making. (See *Paper*.) Besides the rags collected in the United Kingdom, the article is imported in large quantities from various foreign countries. Woollen rags, not being available for paper, are much used for manure; but those of a loose texture, and not too much worn, are unravelled by means of machinery, and mixed up with good wool, to form what is known as *shoddy*, with which cheap woollen goods are made; while the refuse is pulverized and dyed various colours, to form the flock used by paper-stainers for their flock-papers.

Ragstone, a stone of the siliceous kind, so named from its rough fracture. It effervesces with acids, and gives fire with steel. It is used for a whetstone without oil or water for sharpening coarse cutting tools. It is abundant in Kent, at Newcastle, and elsewhere. The term is also applied to certain limestones which contain many fragments of shells resembling rags.

Ragu'sa, a seaport of Austria, in Dalmatia, on a peninsula in the Adriatic, is surrounded by old walls flanked with towers, and has several forts. The streets rise terrace-wise, and none of the edifices are remarkable. The trade is now insignificant compared with former times. Ragusa is supposed to have been founded by Greeks in B.C. 589. Falling successively under the dominion of the Romans and the Greek emperors, it finally asserted its independence, which it long maintained, though having to pay tribute to one or other of its powerful neighbours. In 1814 it finally came into the possession of Austria. Pop. 7245.

Ragu'sa, a town of Sicily, 29 miles W.S.W. of Syracuse, on the right bank of the river of its name, divided into Upper and Lower Ragusa. It has considerable manufactures of silk stuffs, and a trade in corn, wine, oil, &c. Pop. 30,443.

Ragwort, RAGWEED, the popular name of various species of composite plants of the genus *Senecio*, found in Britain, so called from the ragged appearance of the leaves. The common ragwort (*S. Jacobæa*) is a perennial with golden yellow flowers, growing by the side of roads and in pastures. It is a coarse weed, refused or disliked by horses, oxen, and sheep, but eaten by hogs and goats.

Rahway, a town of the United States, in Union county, New Jersey, 20 miles S.W. of New York, on river of same name, navigable for small craft. Industries include carriage and other factories. Pop. 7105.

Raian Mœris, a lake basin, or ancient storage reservoir, in the Fayûm, Middle Egypt. It is long since dried up, but the statements of Herodotus, Strabo, and others show that the Nile had been regulated by utilizing a depression in the desert corresponding in shape and situation to the Raian basin. A proposal to reconstruct this reservoir, by means of which an immense area might be brought under irrigation, engages attention. See *Mœris*.

Raiate'a, one of the Society Islands in South-eastern Polynesia; area, 75 sq. miles; pop. 1400, who have been converted to Christianity by English missionaries. The island now belongs to France.

Rai Bareli (rī ba-rā'lē), a town of Oudh, India, administrative head-quarters of district of the same name, on the banks of the Sai, 48 miles S.E. of Lucknow. There is a bridge over the Sai, several interesting ancient structures, and the usual government buildings. Pop. 18,798.—The district forms part of the Lucknow division, has an area of 1751 square miles, and a population of 1,036,521.

Raibolini (rī-bo-lē'nē), Francesco di Marco di Giacomo, usually called Francesco Francia, a famous Italian painter, engraver, medallist, and goldsmith, was born at Bologna about the middle of the 15th century, died 1533. He excelled particularly in Madonnas, and executed a number of admirable frescoes in the church of St. Cecilia at Bologna, but his most famous work is an altar-piece exhibiting the Madonna, St. Sebastian, &c., in the church of St. Giacomo Maggiore in the same city. Three works of his are in the British National Gallery. He was also celebrated as a portrait-painter. Raibolini had a son, Giacomo, who studied under him, and acquired considerable celebrity.

Rājgarh (rā-j-gar'), native state of India, Central Provinces; area, 1486 square miles; pop. 128,943.

Raiidæ, the family of fishes to which the rays (skate, &c.) belong. See *Ray*.

Raikes, Robert, English philanthropist, born at Gloucester 1735, died 1811. He was proprietor of the Gloucester Journal, and originated the system of Sunday-schools by gathering together a number of street children for secular and religious training.

Raikot, a town of Hindustan, in the Punjab, surrounded by a wall and substantially built, formerly capital of a native state. Pop. 9219.

Rail, the common name of the Rallidæ, a family of grallatorial birds comprehending the rails proper (*Rallus*), the coots, waterhens, and crakes. They are characterized by possessing a long bill, which is more or less curved at the tip and compressed at the sides, by having the nostrils in a membranous groove, the wings of moderate length, the tail short, the legs and toes long and slender, the hind-toe placed on a level with the others. Most of the members of the family are aquatic or frequent marshes; but some, as the crakes, frequent dry situations. The principal species of the genus *Rallus* are the water rail of Europe (*R. aquaticus*), about 11 inches in length, of an olive-brown colour, marked with black above, and of a bluish-ash colour beneath, with white transverse markings on the belly, much esteemed for the table; the Virginian rail of America (*R. virginianus*), somewhat smaller than the water rail of Europe; and the great-breasted rail or fresh-water marsh-hen (*R. elegans*), about 20 inches long, which inhabits the marshes of the Southern States of America. The land rail, so named, is the corn-crake (*Crex pratensis*). See *Corn-crake*.

Railways, roads made by placing on the ground, on a specially prepared track, continuous parallel lines of iron or steel rails, on which carriages with flanged wheels are run with little friction and at consequent high velocities. The necessity for railways originated in the requirements of the coal-traffic of Northumberlandshire, where the first railways, formed on the plan of making a distinct surface and track for the wheels, were constructed. In 1676, near Newcastle-on-Tyne, the coals were conveyed from the mines to the banks of the river, 'by laying rails of timber exactly straight and parallel; and bulky carts were made, with four rollers fitting those rails, whereby the carriage was made so easy that one horse would draw 4 or 5 chaldrons of coal.' Steam-power was first used on these tram-roads early in the present century, but the inauguration of the present great railway system dates from 1821, when an act was passed for the construction of the Stockton and Darlington Railway, which was opened in 1825. The Liverpool and Manchester line was opened in 1830; the London and Birmingham in 1838; the Eastern Counties, now the Great Eastern, in 1839; the London and Southwestern (to Southampton) in 1840; the Great Western in 1841; the Great Northern and the Edinburgh and Glasgow in 1842. In 1846,

when upwards of 250 acts for the construction of railway lines were passed, the speculating mania culminated in a disastrous panic. The United States of America quickly followed Britain in railway construction, and between 1830 and 1833 railways were being rapidly opened in the States. Horse railroads extending to a considerable length were in existence before 1830. There was no development of the railway system in France till about 1842, when several great lines were established; Belgium and the Netherlands followed, but Germany, Austria, and Russia were somewhat behind the Western European nations in their railway development. The system has been developed with extraordinary energy in Canada, Australia, India, and the other British colonies.

The modern railway consists of one or more pairs of parallel lines of iron or steel bars, called *rails*, these bars joining each other endwise, and the parallel lines being several feet apart. The width between the rails is called the *gauge*. What is known as the national or standard gauge, used in Britain and the greater part of Europe, and formerly called the *narrow gauge*, measures 4 feet 8½ inches between the rails; the *broad gauge* (now gone out of use) being 7 feet. It is believed to have originally represented the width suitable for the coal wagons of the North of England, and has been found on the whole very satisfactory. In Ireland the gauge is 5 feet 3 inches, in India 5 feet 6. Narrower gauges are used in certain special lines; and in the United States gauges vary from 4 feet 8½ inches to 6 feet. A pair of parallel lines of rails constitutes a *single line* of railway, two pairs a *double line*, and so on. The rails are supported at a little height above the general surface by iron pedestals called *chairs*, which again are firmly fixed to wooden or iron (sometimes stone) supports called *sleepers*, placed at intervals and embedded in the material of the roadway. A railway, in general, approaches as nearly to a straight line between its two extremes as the nature of the country and the necessities of the intermediate traffic will permit. It is carried over valleys, either by *embankments* or *viaducts*, and through hills or elevated ground by deep trenches called *cuttings*, or by tunnels. In favourable cases the surface line of the railway is so adjusted that the materials excavated from the cuttings will just serve to form the embankments. Should the excavated material be in too small quantity to form the embankment, recourse is had to an excavation along the sides of the site of the latter to supply the deficiency. The line of railway can seldom run for any distance on a level, and its various slopes are termed *gradients*, the arrangement of the rises and falls being termed the *grading* of the line. A more or less steep ascent is termed an *incline*. When the line is formed its surface is covered with broken stones or clean gravel called *ballasting*, and in this the sleepers for sustaining the chairs and rails are embedded. The wooden sleepers are laid across the roadway about 3 feet apart from centre to centre, and to them the chairs which sustain the rails are spiked. Sometimes longitudinal wooden sleepers are used along with the transverse sleepers. These consist of beams laid under the rails and secured to the transverse sleepers. When such are used chairs are frequently dispensed with, the rails being formed with a flange at bottom which is fastened directly to the wooden beam. When the railway track is thus completed the work is called the *permanent way*, and it furnishes the route over which carriages or cars, wagons, vans, &c., are dragged by a locomotive engine, a number of these vehicles forming a *train*.

In the railway of a single line of rail it is necessary to make provision for permitting meeting engines or carriages to pass each other by means of *sidings*, which are short additional lines of rail laid at the side of the main line, and so connected with it at each extremity that a carriage can pass into the siding in place of proceeding along the main line. In double lines, in addition to sidings, which are in them also required at many places, it is necessary to provide for carriages crossing from one line of rails to another. This change in the direction of the carriage is effected by *switches*. *Switches* or *points* are short movable rails close to the main rails connected by rods to suitable handles, the extremities of these short rails being formed so as to guide the flanges of the wheels of a carriage from one line of rail to another. Switches are usually coupled or interlocked with the signals or signalling apparatus, so necessary for properly carrying on the traffic—coupled when they are moved simultaneously with the signals, interlocked when the necessary movement of the switches is completed before the signal is moved. Signalling is effected by means of semaphores in daylight and lights of three

colours, white, green or blue, and red, at night. The telegraph is also used in regulating the traffic. (See *Block System.*) The various places along the line of railway, where railway trains stop for taking up or depositing goods or passengers are termed *stations*, with the prefix of *goods* or *passenger*, as they are allotted to the one or the other; the stations at the extremities of a railway are called *termini*. In N. America stations are called *depots*, carriages are *cars*, and goods *freight*.

The mode in which the locomotive acts in moving the carriages or wagons is that by its weight and the friction of its wheels on the rails a tractive force is provided sufficient to enable it to move at a high rate of velocity, and to drag great loads after it. In some particular cases a fixed engine is employed to give motion to a rope by which the carriages are dragged along, the rope being either an endless rope stretched over pulleys, or one which winds and unwinds on a cylinder. Such engines are termed *stationary* engines, and are used chiefly on inclined planes, where the ascent is too steep for the locomotive engine. In some cases the carriages are impelled by atmospheric pressure, and in some few cases by electricity. (See *Atmospheric Railway, Electric Railway.*) The locomotives, passenger carriages, goods wagons or trucks, vans, &c., constitute the *rolling stock* of a railway. In Britain passenger carriages are divided usually into three classes, designed to meet the various requirements of the travelling public. For the sake of uniformity externally, and in many of the details, the carriages are usually made of the same external length, width, and height, and suitably in the interior. The underworks of the carriages may thus be identical in construction, and a uniformity of working and wearing parts is thus secured, which is conducive to economy of maintenance. They are usually from 20 to 30 feet in length, and are divided into compartments. American carriages are from 40 to 60 feet long with a centre passage, the doors being at the ends—with the seats arranged transversely on each side. A platform at the end enables a person to go from end to end of the train. There is generally but one class of passengers, but on long journeys Pullman and other sleeping-cars are used at extra fares. (See *Pullman Car.*) The average speed of express passenger trains in Britain is about 40 miles an hour; parliamentary trains calling at all stations average from 19 to 28 miles an hour; express goods trains from 20 to 25 miles; coal trains about 15 miles. Railways for the local service of large cities are usually partly or wholly underground, as in the London Metropolitan Railway, the Glasgow City and District Railway, &c., or elevated above the street traffic, as in the New York Elevated Railway.

Some of the tunnels, bridges, and viaducts constructed in connection with railways are among the engineering triumphs of the age. Of the former the most notable are those of Mt. Cenis, the St. Gothard, and the Arlberg tunnel in the Alps; the Severn Tunnel, and the Mersey Tunnel in England, and the Hoosac Tunnel in Massachusetts. (See those entries.) The greatest of the railway bridges are those over the Forth and the Tay in Scotland; the Britannia Tubular Bridge over the Menai Straits, North Wales; the Victoria Tubular Bridge, Montreal; the New York and Brooklyn Suspension Bridge. (See *Forth Bridge, Tay Bridge,* also *Bridge.*) There are many stone viaducts of great length. The Congleton Viaduct, on the Manchester and Birmingham Railway, is perhaps the longest in England; it is 1026 yards long and 106 feet high. An iron viaduct 2½ miles long connects the city of Venice with the mainland.

In Britain the railways are the property of joint-stock companies, who construct and work them under the powers granted by act of parliament. The Board of Trade appoints inspectors, confirms by-laws, and prosecutes companies for infringements of statutes. Companies are compelled to make returns of accidents, traffic, &c. A body of three railway commissioners were appointed in 1873 to control and arrange the traffic facilities and arbitrate in disputes between companies. By the Railway and Canal Traffic Act of 1888 this body is to consist of three judges of the superior courts in England, Scotland, and Ireland respectively, who are commissioners *ex officio*, and two appointed commissioners, one of whom has to be experienced in railway business. Government exacts a duty of 5 per cent on the gross receipts from passengers. Railways were at first local undertakings, but there has been a tendency towards amalgamation, so that now almost the whole railway system of Britain is in the hands of a few gigantic companies. The cost of construction for a double line averages from £15,000 to £20,000 a mile; and the cost of working amounts to from 45 to

50 per cent of the traffic returns. In America the cost of construction is considerably less, averaging a little over £11,000 per mile; and the cost of working forms a larger proportion of the earnings than in Europe, though fewer men in comparison are employed. Generally the American railways are of a much less solid and substantial character than those of Britain. Most of the European railways are more or less under government control. The imperial and provincial governments of India are more or less concerned in most of the Indian lines. In Australia and other colonies the governments have also appropriated large sums for railway purposes. In Canada, of a total cost for railways of £130,000,000, about £40,000,000 have been provided for by the federal and provincial governments, and by various municipal authorities. The most important line in the Dominion is the Canadian Pacific, which, connecting with the Intercolonial at Montreal, forms a through line of 4200 miles from the West coast of British Columbia to Halifax in Nova Scotia. (See *Canadian Pacific Railway.*) The chief transcontinental lines of the United States are the Northern Pacific from Lake Superior to the Pacific Coast, and the Central Pacific and Union Pacific from San Francisco to the Eastern States. In Britain there are about 370,000 persons employed in working railways. The capital sunk in railway construction in Britain amounts to some £1,001,000,000, yielding an annual return of about £38,000,000. The total annual receipts amount to about £86,000,000, and the working expenses to about £48,000,000. The total mileage of railways open and working in the United Kingdom in 1895 was 21,174 miles (number of passengers carried about 929,770,000); in India, 19,678 miles; Canada, 15,000 miles; Australasia, 11,200 miles; South Africa, 2500 miles. In the United States there are about 180,000 miles of railway. For railway mileage of other countries see the various articles. The total mileage of the railways of the world in 1896 was in round numbers 428,000 miles.

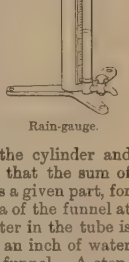
Raimondi (rā-ī-mon'dē), Marco Antonio, Italian engraver, born at Bologna in 1475 or 1488; died 1534 or 1546. About 1505 he went to Venice, where he made some copies from Dürer's works. From 1510 to 1527 he worked at Rome, but retired to Bologna after the capture of Rome by the Constable of Bourbon. He is best known for his engravings of Raphael's designs, which as regards drawing and expression, and in rendering the very spirit of the original, have never been equalled.

Rain, the water that falls from the heavens. Rain depends upon the formation and dissolution of clouds. The invisible aqueous vapour suspended in the atmosphere, which forms clouds, and is deposited in rain, is derived from the evaporation of water, partly from land, but chiefly from the vast expanse of the ocean. At a given temperature the atmosphere is capable of containing no more than a certain quantity of aqueous vapour, and when this quantity is present the air is said to be saturated. Air may at any time be brought to a state of saturation by a reduction of its temperature, and if cooled below a certain point the whole of the vapour can no longer be held in suspension, but a part of it condensed from the gaseous to the liquid state will be deposited in dew or float about in the form of clouds. If the temperature continues to decrease, the vesicles of vapour composing the cloud will increase in number and begin to descend by their own weight. The largest of these falling fastest will unite with the smaller ones they encounter during their descent, and thus drops of rain will be formed of a size that depends on the thickness, density, and elevation of the cloud. The point to which the temperature of the air must be reduced in order to cause a portion of its vapour to form clouds or dew is called the dew-point. The use of the spectroscope has become to some extent a means of anticipating a fall of rain, since when light that has passed through aqueous vapour is decomposed by the spectroscope a dark band is seen (the *rain-band*), which is the more intense the greater the amount of vapour present. The average rainfall in a year at any given place depends on a great variety of circumstances, as latitude, proximity to the sea, elevation of the region, configuration of the country and mountain ranges, exposure to the prevailing winds, &c. When the vapour-laden atmosphere is drifted towards mountain ranges it is forced upwards by the latter, and is consequently condensed, partly by coming into contact with the cold mountain tops, and partly by the consequent expansion of the air due to the greater elevation. The presence or absence of vegetation has also considerable influence on the rainfall of a district. Land devoid of vegetation has its soil intensely heated by the

fierce rays of the sun, the air in contact with it also becomes heated, and is able to hold more and more moisture, so that the fall of rain is next to impossible. On the other hand, land covered with an abundant vegetation has its soil kept cool, and thus assists in condensation. Although more rain falls within the tropics in a year, yet the number of rainy days is less than in temperate climes. Thus in an average year there are 80 rainy days in the tropics, while in the temperate zones the number of days on which rain falls is about 160. At the equator the average yearly rainfall is estimated at 95 inches. At a few isolated stations the fall is often very great. At Cherrapungee, in the Khasia Hills of Assam, 615 inches fall in the year, and there are several places in India with a fall of from 190 to 280 inches. In Britain, Skye and a large portion of the mainland to the S.E. as far as Loch Lomond, the greater part of the lake district of Northern England, and the mountainous parts of Wales have an average of 80 inches and upwards (the highest, 128·50 inches at Glencroe in Argyleshire). The S.E. of England has the smallest, 22·50 to 25 inches. The rainfall at Paris is 22 in.; New York, 43 in.; Washington, 41 in.; San Francisco, 22 in.; Sitka, Alaska, 90 in.; Honduras, 153 in.; Maranhão, 280 in.; Singapore, 97 in.; Canton, 78 in.; New South Wales, 46 in.; South Australia, 19 in.; Victoria, 30 in.; Tasmania, 20 in.; Cape Colony, 24 in. The greatest annual rainfall hitherto observed seems to be on the Khasia Hills.

Rainbow, a bow, or an arc of a circle, consisting of all the prismatic colours, formed by the refraction and reflection of rays of light from drops of rain or vapour, appearing in the part of the heavens opposite to the sun. When the sun is at the horizon the rainbow is a semicircle. When perfect the rainbow presents the appearance of two concentric arches; the inner being called the *primary*, and the outer the *secondary* rainbow. Each is formed of the colours of the solar spectrum, but the colours are arranged in the reversed order, the red forming the exterior ring of the primary bow, and the interior of the secondary. The primary bow is formed by the sun's rays entering the upper part of the falling drops of rain, and undergoing two refractions and one reflection; and the secondary, by the sun's rays entering the under part of the drops, and undergoing two refractions and two reflections. Hence, the colours of the secondary bow are fainter than those of the primary. Rainbows are sometimes produced by the sun's rays shining on the spray of cascades, fountains, &c., and then a whole circle can frequently be seen. A broken rainbow mostly occurs from the field not being filled with falling rain, but it will also happen when the sun is invisible from part of the field. The moon sometimes forms a bow or arch of light, more faint than that formed by the sun, and called a *lunar rainbow*. A *spurious* or *supernumerary rainbow* is a bow seen in connection with a fine rainbow, lying close inside the violet of the primary bow, or outside that of the secondary one. Its colours are fainter and more impure, as they proceed from the principal bow, and finally merge into the diffused white light of the primary bow, and outside the secondary.

Rain-gauge, or PLUVIOMETER, an instrument used to measure the quantity of rain which falls at a given place. They are variously constructed. A convenient form (shown in figure) consists of a cylindrical tube of copper, with a funnel at the top where the rain enters. Connected with the cylinder at the lower part is a glass tube with an attached scale. The water which enters the funnel stands at the same height in the cylinder and glass tube, and being visible in the latter the height is read immediately on the scale, and the cylinder and tube being constructed so that the sum of the areas of their sections is a given part, for instance a tenth of the area of the funnel at its orifice, each inch of water in the tube is equivalent to the tenth of an inch of water entering the mouth of the funnel. A stop-cock is added for drawing off the water. A simpler form of gauge consists of a funnel having at the mouth a diameter of 4·697 inches, or an area of 17·33 square inches. Now as a fluid ounce contains 1·733 cubic inches, it follows that for every fluid ounce collected by this gauge the tenth of an inch of rain has fallen. Recently-constructed automatic gauges give a continuous record of rainfall; indicate the duration of each shower, the amount of rain that has fallen, and the rate at which it fell.



Rain-gauge.

Rain-tree (*Pithecolobium saman*), a leguminous tree of tropical America, now largely planted in India for the shade it furnishes, and because it flourishes in barren salt-impregnated soils, as well as for its sweet pulpy pods, which are greedily eaten by cattle. Another species, *P. dulce*, has also been introduced into India, its pods also being edible.

Rainy Lake, or RÉNÉ LAKE, a body of water forming part of the boundary between Minnesota and Canada. It is about 50 miles long, and of irregular breadth; receives the waters of numerous small lakes from the east and north-east, and empties itself by Rainy River, about 90 miles long, into the Lake of the Woods.

Raipur (rī-pör'), a town of India, headquarters of district of same name in the Chhattisgarh division, Central Provinces. It has an ancient fort, the usual government buildings, important schools, and does a large trade in grain, lac, cotton, &c. Numerous water-tanks are in the vicinity. Pop. 23,759. —The district includes within its limits four small feudatory states; area, 11,724 square miles; pop. 1,584,427.

Rais, or RETZ (rā or rās), GILLES DE LAVAL, SEIGNEUR DE, French marshal, born 1396, died 1440. He distinguished himself in the wars with the English, and has acquired a disgraceful celebrity for outraging and murdering 140 or 160 children, and for other atrocities. He was hung and burnt for his crimes. See *Bluebeard*.

Raised Beaches. See *Beaches, Raised*.

Raisins, the dried fruit of various species of vines, comparatively rich in sugar. They are dried by natural or artificial heat. The natural and best method of drying is by cutting the stalks bearing the finest grapes half through when ripe, and allowing them to shrink and dry on the vine by the heat of the sun. Another method consists of plucking the grapes from the stalks, drying them, and dipping them in a boiling lye of wood-ashes and quicklime, after which they are exposed to the sun upon hurdles of basket-work. Those dried by the first method are called raisins of the sun or sun-raisins, muscatels, or *blooms;* those by the second, *lexias*. The inferior sorts of grapes are dried in ovens. Raisins are produced in large quantities in the south of Europe, Egypt, Asia Minor, California, &c. Those known as Malagas, Alicantes, Valencias, and Denias are well-known Spanish qualities. A kind without seeds, from Turkey, are called *sultanas*. The Corinthian raisin, or currant, is obtained from a small variety of grape peculiar to the Greek islands. The uses of raisins as a dessert and culinary fruit, and in the manufacture of wine, are well known.

Rajah, or RÂJÂ, in India, originally a title which belonged to those princes of Hindu race who, either as independent rulers or as feudatories, governed a territory; subsequently, a title given by the native governments, and in later times by the British government, to Hindus of rank. It is now not unfrequently assumed by the zemindars or landholders, the title *Mahârâjah* (great rajah) being in our days generally reserved to the more or less powerful native princes.

Rájápur', two towns in India: (1) In the Bombay Presidency, at the head of a creek 15 miles from the sea. Pop. 7448. (2) In the N.W. Provinces, on the Jumna. Pop. 7329.

Rájmahál', a town in Hindustan, province of Bengal, on the Ganges, 68 miles W.N.W. of Murshidabad, formerly an important place, now little more than a collection of mud-huts. Pop. about 4000.

Rájmahen'dri, a town in Hindustan, capital of the Godavari district, Madras Presidency, on the east bank of the Godavari, just above its subdivision into two arms, 40 miles from the sea. Pop. 28,397.

Rájpipla, native state of India, in Bombay Presidency, watered by the Nerbudda. Area, 1514 sq. miles; pop. 114,756; capital Nandod.

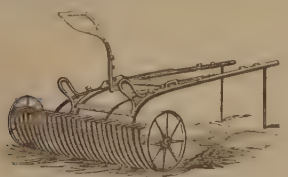
Rájputa'na, a large province of India, under the suzerainty of Britain since 1817, in the west part of Hindustan proper, extending from the Jumna and Chumbul Rivers, west to Sind and Bhawalpur, and comprising the greater part of the Indian Desert. It includes the British district of Ajmere-Merwara and twenty autonomous states, each under a separate chief; has a total area of 132,461 square miles, and a pop. of 11,987,755, exclusive of a considerable Bheel population, estimated at 230,000. Rájputána is intersected by the Aravali Mountains, to the north of which the country is desert, and part of it wholly destitute of inhabitants, water, and vegetation. The soil is remarkably saline, containing many salt springs and salt lakes, and much of the well-water is brackish. To the south of the range the country is more fertile, being watered by the drainage of the Vindhya Mountains. The dominant race, though

not the most numerous, is the Rájput, numbering about 700,000. They are the aristocracy of the country; and to a large extent they hold the land either as receivers of rent or as cultivators. They are essentially a military people, and many of their institutions bear a strong resemblance to the feudal customs which prevailed in Europe in the middle ages. They have likewise been celebrated for their chivalrous spirit, so unlike the effeminacy and duplicity of many of the oriental nations. The province, which is traversed by two railway lines, is administered by a governor-general's agent.

Rájputs. See *Rájputana.*

Rájsháhi, a division or commissionership of Bengal, extending from the Ganges to Sikkim and Bhutan. Area, 17,428 square miles; pop. 8,019,187. — The district of Rájsháhi, forming part of the division, has an area of 2361 sq. miles; a pop. of 1,313,336. Capital of div. and dist. Rámpur Beauleah.

Rake, an implement which in its simplest form consists merely of a wooden or iron bar furnished with wooden or iron teeth, and firmly fixed at right angles to a long



Horse-rake.

handle. In farming it is used for collecting hay, straw, or the like, after mowing or reaping; and in gardening it is used for smoothing the soil, covering the seed, &c. Large rakes for farm work are adapted for being drawn by horses; and there are many modifications both of the hand-rake and the horse-rake.

Rakoczy (rä-kō'tsi), a famous princely family, now extinct in the male line, which for some time ruled the principality of Siebenbürgen or Transylvania, and by maintaining the civil and religious rights of the inhabitants made itself equally serviceable to them and formidable to the house of Austria. The first prince of the name was Sigismund Rakoczy, who obtained the government in 1606. The line ended with Prince Francis Leopold, born 1676. He led the Hungarian insurgents against Austria in 1703, and died in exile in 1735.

Rakoczy March (rä-kō'tsi), a simple yet stirring march by an unknown composer, and a very favourite one with the army of Francis Rakoczy (see above). It was adopted by the Magyars as their national march.

Rak'shasas, in Hindu mythology, a class of evil spirits or genii, cruel monsters, frequenting cemeteries, devouring human beings, and assuming any shape at pleasure. They are generally hideous, but some, especially the females, allure by their beauty.

Râle (räl), in pathology, a noise or crepitation caused by the air passing through mucus in the bronchial tubes or lungs. There are various râles—the *crepitant,* the *gurgling,* the *sibilant,* the *sonorous,* &c. The râle or rattle which precedes death is caused by the air passing through the mucus, of which the lungs are unable to free themselves.

Raleigh (ral'i), a city in the United States, capital of North Carolina, near the centre of the state. Among the principal public buildings are the state-house with a handsome columned front, the court-house, and post-office, all in granite. It is an important cotton centre, and the industries are various. Pop. 12,678.

Raleigh (ral'i), or Ralegh, Sir Walter, navigator, warrior, statesman, and writer in the reigns of Elizabeth and James I., was the second son of a gentleman of ancient family in Devonshire, and was born in 1552. He studied at Oxford, and at the age of seventeen he joined a body of gentlemen volunteers raised to assist the French Protestants. Little is known of his adventures for some years, but in 1580–81 he distinguished himself in the Irish rebellion, both by ability and severity. He now became a favourite at court, a result which has been traditionally attributed to an act of gallantry, namely, his throwing his embroidered cloak in a puddle in order that the queen might pass. In 1584 he obtained a charter of colonization and unsuccessfully attempted the settlement of Virginia in one or two following years. In 1584, also, he obtained a large share of the forfeited Irish estates, and introduced here the cultivation of the potato. Through the queen's favour he obtained licenses to sell wine and to export woollens, was knighted and made lord-warden of the Stannaries or tin mines (1585), vice-admiral of Devon and Cornwall, and captain of the queen's guard (1587). In 1588 he rendered

excellent service against the Spanish Armada, and subsequently vessels were fitted out by him to attack the Spaniards. In 1592 he incurred the queen's displeasure by an amour with one of her maids of honour, the daughter of Sir Nicholas Throckmorton.

Sir Walter Raleigh.

Although he made the best reparation in his power, by marrying that lady, he was imprisoned for some months, and banished the queen's presence. To discover the fabled El Dorado or region of gold he planned an expedition to Guiana, in which he embarked in 1595, and reached the Orinoco; but was obliged to return after having done little more than take a formal possession of the country in the name of Elizabeth. In 1596 he held a naval command against Spain under Lord Howard and the Earl of Essex, and assisted in the defeat of the Spanish fleet and the capture of Cadiz. Next year he captured Fayal in the Azores; in 1600 he became governor of Jersey. James I., on his accession in 1603, had his mind soon poisoned against Raleigh, whom he deprived of all his offices. Accused of complicity in Lord Cobham's treason in favour of Arabella Stuart, Raleigh was brought to trial at Winchester in November 1603, found guilty of treason, and sentenced to death. He was, however, reprieved and confined to the Tower. Here he remained for twelve years, devoting himself to scientific and literary work. In 1616 he obtained his release by bribing the favourite Villiers, and by offering to open a mine of gold which he believed to exist near the Orinoco. The enterprise proved disastrous. Raleigh's force had attacked the Spaniards, and on his return James, to favour the Spanish court, with his usual meanness and pusillanimity determined to execute him on his former sentence. After a trial before a commission of the privy-council the doom of death was pronounced against him, and was carried into execution October 29, 1618. As a politician and public character Raleigh is doubtless open to much animadversion; but in extent of capacity and vigour of mind he had few equals, even in an age of great men. His writings are on a variety of topics, besides a few poetical pieces of great merit. His History of the World is one of the best specimens of the English of his day, being at once the style of the statesman and the scholar.

Rallentan'do, also RITARDANDO, or LENTANDO (Italian), in music, indicates that the time of the passage over which it is written is to be gradually retarded.

Ral'lidæ, the rail family of birds. See *Rail*.

Ram, a steam iron-clad ship-of-war, armed at the prow below the water-line with a heavy iron or steel beak intended to destroy an enemy's ships by the force with which it is driven against them. The beak is an independent adjunct of the ship, so that, in the event of a serious collision, it may be either buried in the opposing vessel or carried away, leaving uninjured the vessel to which it is attached. By naval experts the ram is considered as a main element in the solution of the problem of coast defence.

Ram, BATTERING. See *Battering-ram*.

Ram, HYDRAULIC. See *Hydraulic Ram*.

Rama (rä'ma), in Hindu mythology, the name common to a personage appearing as three incarnations of Vishnu, all of surpassing beauty.

Ramadan', RHAMAZAN', or RAMADZAN', the ninth month in the Mohammedan year, during which it is said Mohammed received his first revelation. It is devoted to fasting and abstinence. From sunrise to sunset for the thirty days of its duration the Mohammedans partake of no kind of nourishment. After sunset necessary wants may be satisfied, and this permission is liberally taken advantage of. Believers are exempted in peculiar circumstances from observing the fast. As the Mohammedans reckon by lunar time, the month begins each year

eleven days earlier than in the preceding year, so that in thirty-three years it occurs successively in all the seasons.

Râmâ'yana, the older of the two great Sanskrit epics (see *Mahâbhârata*) ascribed to the poet Valmiki, and dating probably from the 5th century B.C. The hero is Rama, an incarnation of Vishnu, as the son of the King of Oudh. It relates his marriage with Sita, their wanderings in the forest, the seizure of Sita by the giants of Ceylon, her recovery, and the restoration of Rama to the throne of his ancestors. It contains 24,000 verses, and is divided into seven books. See *Sanskrit Language and Literature.*

Ramboo'tan, the fruit of the tree *Nephelium lappaceum*, nat. order Sapindaceæ, much prized in the Malayan Archipelago. It is about the size of a pigeon's egg, and of a red colour. It is said to be rich and of a pleasant acid.

Rambouillet (ràn-bö-yā), a town of France, department of Seine-et-Oise, in a beautiful valley near the extensive forest of same name, 27 miles south-west of Paris. It is remarkable only for its château, long the residence of the kings of France, and a fine park, in which the first model farm in France was established. Pop. 5186.

Rambouillet (ràn-bö-yā), CATHERINE DE VIVONNE, MARQUISE DE, born at Rome 1588, died 1665. In 1600, when only twelve years old, she married Charles d'Angennes, son of the Marquis de Rambouillet, to whose title and estates he succeeded on the death of the latter in 1611. Her residence at Paris, the Hôtel Rambouillet, for more than fifty years formed the centre of a circle which exercised great influence on French language, literature, and civilization. Her circle is said to have suggested Molière's comedy of the Précieuses Ridicules, but this play was not so much directed against it as against the numerous ridiculous coteries which sprang up in imitation.

Rameau (rà-mō), JEAN PHILIPPE, French musical writer, born at Dijon 1683, died at Paris 1764. He was appointed organist in Clermont Cathedral, and in 1722 printed a treatise, entitled Traité de l'Harmonie, followed by Nouvelle Système de Musique, &c. His fame as a theorist chiefly depends on his Demonstration of the Principles of Harmony, published in 1750. This work procured him an invitation from the court to superintend the opera at Paris. He was also the author of several operas, and a great variety of ballets, concertos, gavottes, songs, &c. Louis XV. acknowledged his merits by the grant of a patent of nobility, and the order of St. Michael.

Ramee. See *Ramie.*

Ramé, LOUISE DE LA (OUIDA), English novelist of French extraction, born at Bury St. Edmunds 1840, has latterly lived much in Italy. She published her first novel, Held in Bondage, in 1863, and since then has been a very prolific writer. Among her best works are Strathmore, Chandos, Puck, Moths, Princess Napraxine, A House Party, Gilderoy, &c.

Ramée, PIERRE DE LA. See *Ramus.*

Ram'eses, or **RAMSES** (in Egyptian, 'the Child of the Sun'), the name given to a number of Egyptian kings.—RAMESES I. was the first king of the nineteenth dynasty, and was not among the most remarkable of the series.—RAMESES II., grandson of the preceding, was the third king of the nineteenth dynasty, and was born in the quarter of a century preceding the year 1400 B.C. He is identified by many with the Sesostris of Greek writers. (See *Sesostris.*) His first achievement was the reduction of Ethiopia to subjection. He defeated a confederation among whom the Khita or Hittites were the chief in a great battle near the Orontes in Syria, and in a subsequent stage of the war took Jerusalem and other places. He was a zealous builder and a patron of art and science. He is supposed to have been the king who oppressed the Hebrews, and the father of the king under whom the exodus took place.—RAMESES III., the Rhampsinitus of Herodotus, belonged to the twentieth dynasty, and was uniformly successful in war. He endeavoured to surpass his ancestors in the magnificence of his buildings.

Ram'eses, one of the treasure-cities of Egypt built by the Hebrews during the oppression, and probably named after Rameses II. It has been identified by Lepsius with Tell-el-Maskhûta on the Fresh-water Canal (about 12 miles west of the Suez Canal), and by Brugsch with Tanis the modern San.

Rames'waram, a low sandy island in the Gulf of Manaar, between the mainland of India and Ceylon. It is about 11 miles long and 6 broad, and contains one of the most venerated Hindu temples in India, the resort of thousands of pilgrims. Pop. 17,854.

Rámgarh, a town of India, in Jaipur state, Rajputana. Pop. 11,313.

Ramie', RAMEE', a name applied to various fibre-plants of the nettle family or to the fibre yielded by them. The chief of these are *Boehmeria nivea*, or China grass (also called *Urtica nivĕa*), and *Boehmeria tenacissima* (or *U. tenacissima*), which some maintain to be the true ramie plant. (See *China Grass.*) A kind of ramie has also been prepared from a common European nettle (*Urtica dioica*), and from *Laportea canadensis*, a North American nettle, introduced into Germany as a fibre plant.

Ramillies (rà-mi-yē), a village of Belgium, province of Brabant, 13 miles north of Namur, and 28 south-east of Brussels. On May 23, 1706, the Duke of Marlborough gained here a great victory over the French under Marshal Villeroi.

Ramists, the followers or disciples of Peter Ramus. See *Ramus*.

Rammo'hun Roy, an Indian rajah, founder of the Brahmo-Somaj (which see) sect of theists, born at Burdwan, Bengal, 1776; died near Bristol 1833. His parents were Brahmans of high rank. He acquired a mastery of Sanskrit, Persian, Arabic, English, Latin, Greek, and Hebrew. A careful study of the sacred writings of the Hindus had convinced him that the original Hindu religion was theistic, and he became anxious to reform the creed and practice of his countrymen in this direction. From the perusal of the New Testament he found the doctrines of Christ more in harmony with his own opinions than any others which had come to his knowledge, and in 1820 he accordingly published a work entitled the Precepts of Jesus the Guide to Peace and Happiness, consisting chiefly of a selection of moral precepts from the Evangelists. Rammohun Roy, in his doctrinal views, was a Unitarian, or Arian, holding, however, the pre-existence and superangelic dignity of Christ. In 1833 he visited England as ambassador from the King of Delhi, and while there was seized with a fever, which proved fatal.

Rámnád', a town of India, presidency of Madras, near the Gulf of Manaar. It has a fort, a palace, a Protestant and two R. Catholic churches. Pop. 13,500.

Rámnagar (räm'na-gar), a town of India, Benares district, North-western Provinces, about 2 miles above Benares city. It is a considerable commercial centre, and the residence of the Maharajah of Benares. Pop. 11,859.

Rampant, in heraldry, standing upright upon its hind-legs (properly on one foot) as if attacking: said of a beast of prey, as the lion. It differs from *salient*, which means

Rampant.

Rampant gardant.

in the posture of springing forward. *Rampant gardant* is the same as *rampant*, but with the animal looking full-faced. *Rampant regardant* is when the animal in a rampant position looks behind.

Rampart, in fortification, an elevation or mound of earth round a place, capable of resisting cannon-shot, and on which the parapet is raised. The rampart is built of the earth taken out of the ditch, though the lower part of the outer slope is usually constructed of masonry. The term in general usage includes the parapet itself.

Ramphas'tos, the generic name of the toucans.

Ram'pion, *Campanŭla Rapuncŭlus*, a plant of the nat. order Campanulaceæ, or bellworts, indigenous to Britain, as well as to various parts of the continent of Europe. Its root may be eaten in a raw state like radish, and is by some esteemed for its pleasant nutty flavour. Both leaves and root may also be cut into winter salads. Round-headed rampion (*Phyteuma orbiculāre*) and spiked rampion (*P. spicātum*) are also British plants, the roots and young shoots of which are occasionally used as an article of food.

Rámpur', capital of a native state of the same name, North-western Provinces of India, on the left bank of the Kosila River, 18 miles E. of Moradabad. It is the residence of the nawab, and has manufactures of pottery, damask, sword-blades, and jewellery. Pop. 76,733 —The state, which is under the political superintendence of the government of the North-western Provinces, has an area of 899 square miles and a pop. of 541,914.

Rámpur Beauleah, town of India, capital of Rájsháhi district, Bengal, on the N. bank of the Ganges. It has a large traffic by river with the railway-station of Kushtia on the opposite bank. Pop. 21,407.

Ramree', or RAMRI ISLAND, in the Bay of Bengal, off the coast of Burmah, is 40

miles long and 15 in breadth. Produces rice, indigo, sugar, petroleum, &c.

Ramsay, ALLAN, Scottish poet, born 1686, at Leadhills, in Lanarkshire; died at Edinburgh 1758. His father, who was superintendent of Lord Hopetoun's mines, died when Allan was yet an infant. He removed to Edinburgh in his fifteenth year and was apprenticed to a wig-maker, an occupation which he followed till his thirtieth year. His poems, most of them printed as broadsides, soon made him widely known among all classes, and he now abandoned wig-making, and commenced business as a bookseller. He was the first to start a circulating library in Scotland. In 1720 he published a collection of his poems in one volume quarto. In 1724 the first volume of The Tea-Table Miscellany, a Collection of Songs, appeared. The rapid sale of this compilation induced Ramsay to publish another, entitled The Evergreen, being a Collection of Scots Poems wrote by the Ingenious before 1600, which was equally successful. His next publication established his fame upon a sure and lasting basis. This was The Gentle Shepherd (1725)—the best pastoral perhaps in any language. In 1728 a second quarto volume of his poems appeared; and in 1730 his Thirty Fables, which concluded his public poetical labours. He did not give up his shop until within three years of his decease. He rendered great service to the vernacular literature by editing and imitating the old Scottish poetry, but his fame rests chiefly on the inimitable Gentle Shepherd. His son ALLAN, born 1709, died 1784, became famous as a portrait-painter in London. In 1767 he was appointed principal painter to George III.

Ramsay, SIR ANDREW CROMBIE, LL.D., geologist, born in Glasgow 1814. He joined the Geological Survey in 1841; was appointed to the chair of geology at University College, London, 1848; was lecturer at the School of Mines 1851; director-general of the Geological Survey and of the Museum of Practical Geology from 1872 to 1881. He died in 1891. He is author of Physical Geology and Geography of Britain, Geology of Arran, &c.

Ramsay, ANDREW MICHAEL, known as the Chevalier Ramsay, was born in Ayr 1686, died at St. Germain-en-Laye 1743. After spending some time at the Universities of Edinburgh and St. Andrews, he went to Leyden. In 1710 he repaired to Cambray, where he was converted to the Roman Catholic faith by Fénelon. He procured the preceptorship to the Duke of Château-Thierry and the Prince of Turenne, and was afterwards engaged to superintend the education of Prince Charles Edward Stuart and his brother Henry, afterwards Cardinal York. He acquired distinction by his writings, which are chiefly in French. The chief of these are a Life of Viscount Turenne, a Life of Fénelon, the Travels of Cyrus, a romance, and a large work on the Principles of Natural and Revealed Religion.

Ramsay, DAVID, American patriot and historian, born in Pennsylvania 1749, died at Charleston 1815. He served as surgeon during the Revolutionary war, was a delegate to the Continental Congress in 1782–86, and president of the South Carolina Senate for seven years. He was shot by a lunatic. Chief works: History of the Revolution in South Carolina, History of the American Revolution, History of the United States, &c.

Ramsay, EDWARD BANNERMAN, son of Alexander Burnett, advocate, born at Aberdeen 1793, died at Edinburgh 1876. He adopted the name of his grand-uncle Sir Alex. Ramsay, by whom he was educated. Educated at Cambridge he took holy orders, and came to Edinburgh in 1823 as a clergyman of the Scottish Episcopal Church, becoming dean of the diocese in 1846. He is best known by his Reminiscences of Scottish Life and Character, which has had a great popularity.

Ramsbottom, a town of Lancashire, on the Irwell, 4 miles N. of Bury; with cotton manufactures, &c. Pop. 16,726.

Ramsden, JESSE, mathematical instrument maker, born at Halifax, 1735; died at Brighton, 1800. He married a daughter of Dollond, the optician, and gained great celebrity for his divided circles, transit instruments, &c. He was a fellow of the Royal Society and of the Academy of St. Petersburg, and his instruments were known all over Europe.

Ramsey, seaport in the Isle of Man, 14 miles N.N.E. of Douglas. The attractive scenery, fine sands, promenades, and pier make it a favourite resort of visitors. Pop. 4866.

Ramsey, market-town (giving name to parl. div.) in Huntingdonshire, 10 miles N.N.E. Huntingdon. Pop. 4684.

Ramsgate, a seaport and watering-place of England, county of Kent, in the Isle of Thanet, 67 miles east by south of London. The older parts occupy a natural hollow or

valley in the chalk cliffs that line this part of the coast, while the newer portions occupy the higher ground on either side. It is a well-built town, possesses a fine stretch of sand and a promenade pier, and is much frequented by visitors. The harbour, which serves as a harbour of refuge for the Downs, is nearly circular, comprises an area of about 50 acres, and includes a dry dock and a patent slip for the repair of vessels. It is protected by two stone piers 3000 and 1500 feet long, with an entrance of 240 feet. Ship-building and rope-making are carried on; there is some trade in coal and timber, and a considerable fishery. Ramsgate was formerly a member of the Cinque Ports, and attached to Sandwich; it is now a separate municipal borough. Pop. 24,676.

Ramsons, *Allium ursinum*, a species of garlic found wild in many parts of Britain, and formerly cultivated in gardens.

Ramtek, a town of India, Nagpur district, Central Provinces, 24 miles N. of Nagpur city, celebrated as a holy place, and the resort of great numbers of pilgrims. Pop. 7814.

Ramtil Oil, a bland oil similar to sesamum oil, expressed from the seeds of a composite annual herb, *Guizotia oleifera*, cultivated in Abyssinia and various parts of India.

Ramus, PETER, or PIERRE DE LA RAMÉE, French logician and classical scholar, born in Vermandois 1515, killed in the massacre of St. Bartholomew 1572. He went to Paris about 1523, and studied under great difficulties. He attacked Aristotle and the scholastics, and excited violent opposition. In 1551 he was appointed royal professor of rhetoric and philosophy at Paris. In 1561 he became a Protestant. He published a Treatise on Logic in 1543, which obtained great success, as did also his other works on grammar, mathematics, philosophy, theology, &c. His doctrines were widely diffused. France, England, and particularly Scotland were full of Ramists. His logic was introduced into the University of Glasgow by Andrew Melville, and made considerable progress in the German universities.

Rana. See *Frog.*

Rancé (rän-sā), ARMAND JEAN LE BOUTHILLIER DE, the founder of the reformed order of La Trappe, born at Paris 1626, died 1700. He embraced the ecclesiastical profession, and held no fewer than six benefices. Residing at Paris, he gave himself up to a life of dissipation. In 1657, however, a marked change took place in his character. He demitted all his benefices except the priory of Boulogne and the abbey of La Trappe. Retiring to the latter place in 1664, he began those reforms which have rendered his name famous. (See *La Trappe.*) He passed thirty-three years in this retirement, during which he wrote a number of works, mostly of an ascetic character.

Randers, a town of Denmark, in Jutland, on the left bank of the Guden-aa, about 6 miles above its mouth in the Randers Fiord, 111 miles W.N.W. of Copenhagen. It contains an arsenal, and has manufactures of gloves. Pop. 13,457.

Range, in gunnery, the horizontal distance to which a shot or other projectile is carried. When a cannon lies horizontally it is called the point-blank range; when the muzzle is elevated to 45 degrees it is called the utmost range. To this may be added the ricochet, the skipping or bounding shot, with the piece elevated from 3 to 6 degrees. Several instruments have been invented for the purpose of finding the range or distance of objects against which guns are to direct their fire, being known as *range-finders* or *telemeters*. They generally depend on trigonometrical principles and on the use of telescopes.

Ranger, in England, formerly a sworn officer of a forest, appointed by the king's letters patent, whose business was to watch the deer, prevent trespasses, &c.; but now merely a government official connected with a royal forest or park.

Rangoon', the capital of Lower Burmah, and the chief seaport of Burmah, is situated at the junction of the Pegu, Hlaing or Rangoon, and Pu-zun-doung rivers, about 21 miles from the sea. Since its occupancy by the British in 1852 Rangoon has undergone such changes that it is practically a new town, and its population has increased fivefold. The principal streets are broad, and contain many large and not a few handsome buildings. There are government buildings, town-hall, law-courts, custom-house, Anglican and Roman Catholic cathedrals, St. John's College, high-school, famous pagoda, &c. A large and increasing commerce is carried on with British, Indian, and Chinese ports; and an extensive trade is conducted by railway and river with the interior. The chief exports are rice, timber, cotton, hides, gums and resins, mineral oil, ivory, precious stones; the imports being mainly manufactured goods. A number of rice-mills have

been erected; there is a government dock-yard, and steam tram-cars have been introduced. Pop. 181,210. Of the population

about 80,000 are Buddhists (Burmese) and 58,000 Hindus. Rangoon was held by the British from 1825 to 1827.

Rangpur', a district in the Rajshahi division of Bengal; area, 3486 sq. miles. This territory is flat and well-watered, the chief product being rice. Pop. 2,097,964.—RANGPUR, the capital, is situated on the Ghaghát river, 270 miles N.E. of Calcutta. Pop. 14,300.

Raniganj', a town of India, in Bardwán district of Bengal; on the north bank of the Dámodar river, 120 miles N.W. of Calcutta. It is notable chiefly for its bituminous coal, the seams of which are of great thickness. Pop. 13,770.

Rank, a line of soldiers standing abreast or side by side: often used along with *file*, which is a line running from the front to the rear of a company, battalion, or regiment, the term *rank and file*, thus comprising the whole body of the common soldiers.

Ranke (ràn'kė), LEOPOLD VON, German historian, born in 1795, died 1886. He studied at Halle and Berlin, became a teacher in the gymnasium of Frankfurt-on-the-Oder in 1818, and professor of history at the University of Berlin in 1825. His first published work (1824) was a History of the Romance and Teutonic Nations from 1494 to 1535. This was followed by Princes and Peoples of Southern Europe in the 16th and 17th Centuries (1827), The Servian Revolution (1829), History of the Popes (1834–37), History of Germany in the time of the Reformation (1839–47), History of Prussia during the 17th and 18th centuries (1847–48), History of France, chiefly in the 16th and 17th centuries (1852–55), History of England in the 17th century (1859–68), besides a number of smaller works supplementary of his History of Germany. At the age of eighty he undertook with undiminished vigour to write a World-history, and a volume of this great work appeared every year until his death. His writings are chiefly valuable for the new material which he discovered in state papers, and the truth with which he presented history unbiassed by personal predilections. Many of his works have been translated into English.

Rankine, WILLIAM JOHN MACQUORN, civil engineer, born at Edinburgh in 1820, died 1872. He received his instruction in natural philosophy from Professor Forbes, his practical training as an engineer from Sir J. Macneill, and he became himself professor of engineering at Glasgow University in 1855. His numerous contributions to the technical journals have been reprinted (London, 1881), and he was the author of text-books on Civil Engineering, The Steam Engine, Applied Mechanics, Shipbuilding, &c. He was especially successful in investigating mathematically the principles of mechanical and civil engineering. He was also well known as a song-writer.

Ranking and Sale, in Scots law, the process whereby the heritable property of an insolvent person is judicially sold and the price divided amongst his creditors according to their several rights and preferences. This is the most complex and comprehensive process known in the law of Scotland, but now practically obsolete.

Rannoch, LOCH, a lake, Perthshire, Scotland, 35 miles N.N.W. of Perth, 11 miles long, and about 1 mile average breadth. It contains two islands, and has an outlet for its waters in the Tummel, a tributary of the Tay. Westward from the loch extends the Moor of Rannoch, which is 28 miles long by 16 miles broad.

Ransom, the money or price paid for the redemption of a prisoner, captive, or slave, or for goods captured by an enemy, and formerly a sum paid for prisoners of war.

Ranters, a name given by way of reproach to a denomination of Christians which sprang up in 1645. They called themselves *Seekers*, the members maintaining that they were seeking for the true church and its ordinances, and the Scriptures, which were lost. The name *Ranters* is also vulgarly applied to the Primitive Methodists, who formed themselves into a society in 1810, and who were in favour of street preaching, camp-meetings for religious purposes, as also of females being permitted to preach.

Ranuncula'ceæ, a nat. order of exogenous polypetalous plants, in almost all cases herbaceous, inhabiting the colder parts of the world, and unknown in hot countries except at considerable elevations. They have radical or alternate leaves (opposite in Clematis), regular or irregular, often large and handsome flowers, and fruits consisting of one-seeded achenes or many-seeded follicles. There are about 30 genera and 500 species. They have usually poisonous qualities, as evinced by aconite and hellebore in particular. Some of them are objects of beauty, as the larkspurs, ranunculus, anemone, and pæony. See next article.

Ranun'culus, a genus of herbaceous plants, the type of the nat. order Ranunculaceæ. They have entire, lobed, or compound leaves, and usually panicled, white or yellow flowers. The species are numerous, and almost exclusively inhabit the northern hemisphere. Almost all the species are acrid and caustic, and poisonous when taken internally, and, when externally applied, will raise blisters. The various species found wild in Britain are known chiefly by the common names of crowfoot, buttercup, and spearwort. *R. flammŭla* and *sceleratus* produce a blister on the skin in about an hour and a half. Beggars use them for the purpose of forming artificial ulcers to excite the compassion of the public. *R. Ficaria* is the lesser celandine. *R. aquatilis* is the water crowfoot, a nutritive food for cattle.

Ranz-des-vaches (rânz-dā-vâsh), the name of certain simple melodies of the Swiss mountaineers, commonly played on a long trumpet called the *alpenhorn*. They consist of a few simple intervals, and have a beautiful effect in the echoes of the mountains.

Raoul Rochette. See *Rochette* (*Desiré Raoul*).

Rapallo, town of Italy, province of Genoa, on a small bay 18 miles E.S.E. of Genoa. It is a winter residence for persons in delicate health. Pop. 10,179.

Rape, the carnal knowledge of a woman forcibly and against her will. By the English law this crime is felony, and is punishable with penal servitude for life. By 24 and 25 Vict. (1861) cap. c. unlawfully and carnally knowing any girl under the age of ten years, with or without her consent, was regarded as rape, and punishable as such; if the girl were between the ages of ten and twelve the punishment was penal servitude for five years, or imprisonment not exceeding two years with or without hard labour. But by the Criminal Law Amendment Act of 1885 the maximum penalty of penal servitude for life has been extended to the defilement of girls under thirteen; and the maximum penalty of two years' imprisonment with hard labour has been extended to the defilement of girls under sixteen years. In the case of older females consent must be withheld or there is no rape. In Scotland this crime may still be punished with death, though it never is so. In the United States the crime is treated as a felony, and the punishment is imprisonment for life or a term of years.

Rape, a division of the county of Sussex, an intermediate division between a hundred and a shire, and containing three or four hundreds. The like parts in other counties are called tithings, lathes, or wapentakes.

Rape (*Brassica Napus*), a plant of the cabbage family, cultivated in Europe and India for its seeds, from which oil is extracted by grinding and pressure. It is also cultivated in England for the succulent food which its thick and fleshy stem and leaves supply to sheep when other fodder is scarce. The oil obtained from the seed, which is much the same as colza oil, is used for various economical purposes, for burning in lamps, for lubricating machinery, in medicine, &c. The oil-cake is used as food for sheep and cattle, and as a fertilizer. See next article.

Rape-cake, a hard cake formed of the residue of the seed and husks of rape after the oil has been expressed. This is used for feeding oxen and sheep, but it is inferior to linseed cake and some other kinds of oil-cakes; it is also used as a rich manure, and for this purpose it is imported into Britain in large quantities. See *Rape*.

Raph'ael (or RAFFAELLO) SANZIO or SANTI, one of the greatest painters that ever lived, was born at Urbino 1483, died 1520. His father, Giovanni Sanzio, a painter of some

merit, from whom young Raphael received his first instruction, died in 1494, and he was then intrusted to the care of an uncle. His studies, however, were not interrupted, and at the early age of twelve he was received into the studio of Perugino at Perugia

Raphael Sanzio.

as one of his pupils, and continued with that celebrated painter for six or eight years. The pupil was soon permitted to share in the master's work, and when he came to paint independently he was seen to have acquired Perugino's manner. About this time the painting of the library of the cathedral at Siena was intrusted to Pinturicchio, a fellow-pupil, and Raphael is said to have assisted in the work. In 1504 he visited his native town, and while there painted Christ Praying on the Mount of Olives, a St. Michael, and a St. George, the two last of which are now in the Louvre. Towards the end of the same year he proceeded to Florence, attracted thither by the fame of its numerous artists, and in this centre of the highest artistic life of the time he studied diligently over a period of four years, with short intervals of return to his native city. In Florence he rapidly gained a wider knowledge of his art, and soon began to forsake the manner which he had adopted from Perugino. The sources from which he sought and obtained the artistic knowledge which enabled him to develop his new style were various. From Michael Angelo he learned simplicity and strength of outline, from Leonardo da Vinci he acquired grace of expression and composition, while from Fra Bartolommeo he gained a subtler depth of colouring, and from Masaccio a broader treatment of drapery and dramatic effects. During the last two years of his stay in this city he painted, in what is known as his Florentine manner, many of what are now considered his most important works. Of such may be mentioned the Madonna del Gran Duca (Florence); Madonna del Giardino (Vienna); Holy Family (Madrid); Christ bearing the Cross (Madrid); Marriage of Joseph and the Virgin (Brera, Milan); the Ansidei Madonna (National Gallery); Madonna (belonging to Lord Cowper); Tempi Madonna (Munich); and the Bridgewater Madonna (Bridgewater House). About this time Pope Julius II. had employed Bramante in rebuilding St. Peter's and in embellishing the Vatican, in which work Raphael was invited to assist. Here he executed the Disputa, or Dispute of the Fathers of the Church, on the wall of the second chamber, called the *stanza della Segnatura*, next to the great hall of Constantine. In this painting we recognize the transition to his third manner, which is still more clearly manifested in the School of Athens, the second painting in this chamber. Besides these he painted as Vatican frescoes (1508–11) the allegorical figures of Theology, Philosophy, Justice, and Poetry, in the corners of the ceiling; the Fall of Adam, Astronomy, Apollo and Marsyas, and Solomon's Judgment, all having reference to the four principal figures of the apartment; and, lastly, on the fourth wall, over the windows, Prudence, Temperance, and Fortitude; below them the Emperor Justinian Delivering the Roman Law to Tribonian, and Gregory X. Giving the Decretals to an Advocate, and under them Moses and an armed allegorical figure. After the accession of the new pope, Leo X., Raphael painted, in the *stanza d'Eliodoro*, his Leo the Great Stopping the Progress of Attila, the Deliverance of Peter from Prison, and, on the ceiling, Moses Viewing the Burning Bush, the Building of the Ark, the Sacrifice of Isaac, and Jacob's Dream. With the Conflagration of the Borgo (Incendio del Borgo) Extinguished by the prayers of Leo, Raphael began the third *stanza* of the Vatican. It was followed by the Coronation of Charlemagne, Leo III.'s Vindication of Himself before Charlemagne, and the Victory of Leo IV. over the Saracens at Ostia. During this time Raphael prepared designs for several palaces in Rome and other cities of Italy (notable among which were the series of designs in the Villa

Farnesina to illustrate the story of Cupid and Psyche), finished the Madonna for the church of St. Sixtus in Piacenza (now in Dresden), and painted the portraits of Beatrice of Ferrara, of the Fornarina, of Carondelet (now in England), and of Count Castiglione. It was probably at a later period that Raphael prepared for Augustino Ghigi designs for the building and decoration of a chapel in Sta. Maria del Popolo and for Leo X. the celebrated cartoons for the tapestry of one of the chambers of the Vatican. Seven of these cartoons are now in the South Kensington Museum. To this period also belong his easel-pieces of John in the Desert (of which there exist several copies); his Madonna and Child, on whom an angel is strewing flowers; a St. Margaret (Louvre); the Madonna della Seggiola (Florence), St. Cecilia (Bologna). Raphael's last and unfinished painting — the Transfiguration of Christ — is in the Vatican. Attacked by a violent fever, which was increased by improper treatment, this great artist died at the age of thirty-seven years, and was buried with great pomp in the Pantheon. His tomb is indicated by his bust, executed by Naldini, and placed there by Carlo Maratti. His biography has been written by Vasari, Fuseli, Quatremère de Quincy, Passavant, Crowe and Cavalcaselle, &c.

Rapha'nia, a disease attended with spasm of the joints, trembling, &c., not uncommon in Germany and Sweden, and said to arise from eating the seeds of *Raphănus Raphanistrum*, or field radish, which often get mixed up with corn.

Raphănus. See *Radish.*

Ra'phe, in botany, the vascular cord communicating between the nucleus of an ovule and the placenta, when the base of the former is removed from the base of the ovulum.

Ra'phia, a genus of palms, rather low trees with immense leaves, inhabiting swampy coasts. *R. vinifĕra*, a native of W. Africa, Madagascar, Polynesia, &c., besides yielding palm-wine, supplies materials for the roofs and other parts of houses, for basket and other work, &c. The *R. tædiyĕra* is equally useful; and the *R.* or *Sagus Ruffia*, a palm of Madagascar, yields sago. The fibre of these palms is known in Europe as *raphia* or *raffia*, and is used for matting, for tying up plants, &c. See also *Jupati Palm.*

Raph'ides, a term applied to all crystalline formations occurring in plant-cells. They consist of oxalate, carbonate, sulphate, or phosphate of lime.

Ra'pier, a light, highly-tempered, edgeless and finely-pointed weapon of the sword kind used for thrusting. It is about 3 feet in length, and was long a favourite weapon for duels. Its use now, however, is restricted to occasions of state ceremonial.

Rapp, GEORGE. See *Harmonists.*

Rapp, JEAN, COUNT, a French general, was born at Colmar in 1772, and in 1788 entered the military service. On the breaking out of the war against Austria, in 1805, he accompanied Napoleon as aide-de-camp, and after the battle of Austerlitz, where he distinguished himself, he was made brigadier-general. In the war with Prussia and Russia he also fought with reputation, and in the summer of 1807 received the chief command in Dantzig. After the overthrow of Napoleon he returned, in 1814, to France, was received with distinction by Louis XVIII., and in March 1815, was intrusted with the command of the first *corps d'armée.* When the defection of the whole army rendered all resistance impossible, Rapp also went over to Napoleon, who made him commander of the army of the Rhine. After Waterloo, when Louis XVIII. returned a second time to Paris, Rapp was pardoned, and retained a command in the army until his death in 1821.

Rappahan'nock, a river of the U. States, in Virginia, which rises in the Blue Ridge, runs E.S.E. about 130 miles, and flows into Chesapeake Bay. It passes the towns of Falmouth, Fredericksburg, Port-Royal, and Leeds, and is navigable to Fredericksburg, 110 miles.

Rappee', a strong kind of snuff, of either a black or a brown colour, made from the ranker and darker kind of tobacco leaves.

Rap'poltsweiler (-vī-lĕr), a town of Germany, in Upper Alsace, at the foot of the Vosges Mountains. Pop. 5902.

Rapto'res, the birds of prey, an order of birds, also called *Accipitres*, including those which live on other birds and animals, and are characterized by a strong, curved, sharp-edged, and sharp-pointed beak, and robust short legs, with three toes before and one behind, armed with long, strong, and crooked talons. The eagles, vultures, falcons, and owls are examples.

Raraton'ga, or RAROTONGA, an island in the South Pacific Ocean, belonging to the group of the Hervey Islands. It is about 30 miles in circuit, and consisting of a mass of mountains, becomes visible at a great distance, and has a very romantic appearance.

The inhabitants, about 4000, have been converted to Christianity.

Rar'itan, a river of New Jersey, U. States, formed by two branches which unitedly flow S.E., and fall into Raritan Bay near Perth Amboy. It is navigable as far as New Brunswick.

Ras, an Arabic word signifying 'head,' prefixed to the names of promontories or capes on the Arabian and African coasts.

Rasgrad', a town of Bulgaria, 34 miles south-east of Rustchuk. Pop. 11,625.

Rash, an eruption of red patches on the skin, diffused irregularly over the body. The eruption is usually accompanied with a general disorder of the constitution, and terminates in a few days.

Rashi, properly RABBI SALOMON-BEN-ISAAK, a great Jewish rabbi, born at Troyes, France, in 1040; died 1105. His first instructor in Talmudic literature was his father, who was chief rabbi at Worms. To perfect his knowledge he made extensive journeys through Italy, Greece, Palestine, Egypt, Persia, and Germany, where he was particular in visiting the towns which possessed learned Jewish schools. His most famous work is a Commentary on the Pentateuch; he also wrote commentaries on the Prophets, the Talmud, and various treatises on miscellaneous subjects.

Rasht. See *Reshd*.

Rask, RASMUS CHRISTIAN, Danish philologist, born in 1787, died in 1832. After he had studied at the University of Copenhagen he journeyed through Sweden, Russia, and Iceland to increase his knowledge of northern languages, with the result that he published An Introduction to the Knowledge of the Icelandic or Old Norse Tongue (1811); an edition of Haldorsen's Icelandic Dictionary (1817); and an Anglo-Saxon Grammar (1817). In 1817–22 he made, at the expense of the government, a second journey to Russia, Persia, and India. He then returned to Copenhagen in 1822, was appointed professor of literary history and subsequently professor of oriental languages and librarian to the university. During this period he published a Spanish Grammar, a work on the Frisian language, and a treatise on the Zendavesta, in which he showed that the language was closely akin to Sanskrit.

Raskolniks (Russian, *Raskolniki*, from *raskol*, schism), the collective name given to the adherents of the dissenting sects in Russia, which have originated by secession from the state church. The great majority of these sects date originally from the middle of the 17th century, when the liturgical books, &c., were revised under the patriarch Nikon. The Raskolniks clung fanatically to the old and corrupted texts, and regarding the czar and the patriarch as the representatives of Antichrist, called themselves *Staro-obryadtsy* (old ritualists) or *Staro-vertsy* (followers of the old faith). They have split up into a large number of sects, which may be grouped generally in two classes; those who have a priesthood, and those who have none. The tendency of the Raskolniks is communistic; and they have done much to spread Russian influence by advancing colonies on the outskirts of the empire. They have undergone much persecution at the hands of government, but are now generally unmolested. They include about one-third of the merchant class, and nearly all the Cossacks, but none of the noble or cultivated class. Their numbers are variously estimated at from 3 to 11 millions; the last number is perhaps not far from the truth.

Raso'res, gallinaceous birds or scratchers, an order of birds comprising the sub-orders Gallinacei, or fowls, turkeys, partridges, grouse, &c., and the Columbacei, or pigeons, which are often made a distinct order. The common domestic fowl may be regarded as the type of the order. They are characterized by the toes terminating in strong claws, for scratching up seeds, &c., and by the upper mandible being vaulted, with the nostrils pierced in a membranous space at its base, and covered by a cartilaginous scale. The rasorial birds are, as a rule, polygamous in habits; the pigeons, however, present an exception to this rule, and their young are also produced featherless and helpless.

Rasp, a coarse species of file, but having, instead of chisel-cut teeth, its surface dotted with separate protruding teeth, formed by the indentations of a pointed punch.

Raspail (rás-páy), FRANÇOIS VINCENT, French naturalist, born 1794, died 1878. He settled in Paris in 1815, where he became known as a scientific writer by his Nouveau Système de Chimie Organique (1833), Nouveau Système de Physiologie Végétale et Botanique (1837), and Histoire Naturelle de la Santé et de la Maladie chez les Végétaux et chez les Animaux (1843). He also edited various newspapers, and was prominent in all the French revolutionary movements.

Raspberry, the fruit of the well-known shrubby plant *Rubus Idæus*, natural order Rosaceæ, and the plant itself, which is of the same genus as the bramble or blackberry, dewberry, and cloudberry. It is a native of Britain and most of Europe as well as Asia. Species are also found in America. Several varieties are cultivated, either red, flesh-coloured, or yellow. Raspberries are much used in cookery and confectionery, and the juice, mixed with a certain portion of sugar and brandy, constitutes the liquor called *raspberry brandy*. *Raspberry Vinegar*, a refreshing summer beverage and cooling drink for invalids, is composed of raspberry juice, vinegar, and sugar.

Rasse (*Viverra Malaccensis*), a carnivorous quadruped, closely allied to the civet, spread over a great extent of Asia, including Java, various parts of India, Singapore, Nepâl, and other localities. Its perfume, which is secreted in a double pouch like that of the civet, is much valued by the Javanese. For its sake the animal is often kept in captivity. It is savage and irritable, and can inflict a very severe bite.

Rastadt, or RASTATT, a town in the grand-duchy of Baden, on the river Murg, about 15 miles south-west from Carlsruhe. Its only notable building is the old castle of the Margraves of Baden, and it derives its chief modern importance from being a strong fortress commanding the Black Forest. Pop. 11,740.

Rat, one of the rodent mammalia, forming a typical example of the family Muridæ or mice. The best known species are the (so-called) Norway or brown rat (*Mus decumānus*), and the true English or black rat (*Mus rattus*). The brown rat grows to about 9 inches in length, has a shorter tail than the other, small ears, is of a brownish colour above and white below, and is altogether a much larger and stronger animal. Supposed to have belonged originally to India and China, it only became known in Europe about the middle of the 18th century; but it is now found in almost every part of the habitable globe, and where it has found a footing the black rat has disappeared. It is a voracious omnivorous animal, swims readily in water, breeds four or five times in the year, each brood numbering about a dozen, and these again breed in about six months. The black rat is usually about 7 inches in length, has a sharper head than the other, larger ears, and a much longer tail. It is much less numerous than the brown rat and more timid. To this *Mus rattus* variety belongs the white rat, which is sometimes kept as a household pet. Various other animals are called rats. See *Kangaroo-rat*, *Mole-rat*, *Musk-rat*, and *Vole*.

Rata, a New Zealand tree. See *Metrosideros*.

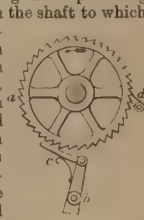
Ratafia (rat-a-fē′a), a fine spirituous liquor flavoured with the kernels of several kinds of fruits, particularly of cherries, apricots, and peaches. *Ratafia*, in France, is the generic name of liqueurs compounded with alcohol, sugar, and the odoriferous and flavouring principles of plants.

Ratan′. See *Rattan Canes*.

Rat′any (*Krameria triandra*), a shrubby plant found in Peru and Bolivia, having an excessively astringent root. It is sometimes used as an astringent medicine in checking bloody or mucous discharges, weakness of the digestive organs, and even in putrid fevers. It has silver-gray foliage and pretty red starlike flowers. Written also *Rhatany*.

Ratchet, an arm or piece of mechanism one extremity of which abuts against the teeth of a ratchet-wheel; called also a *click*, *pawl*, or *detent*. If employed to move the wheel it is called a *pallet*. See next article.

Ratchet-wheel, a wheel with pointed and angular teeth, against which a ratchet abuts, used either for converting a reciprocating into a rotatory motion on the shaft to which it is fixed, or for admitting of circular motion in one direction only, as in a winch, a capstan, &c. For both purposes an arrangement is employed similar to that shown in the figure, in which *a* is the ratchet-wheel, *b* a reciprocating lever, to the end of which is jointed the small ratchet or pallet *c*. This ratchet, when the lever is moved in one direction, slides over the teeth, but in returning draws the wheel with it. The other ratchet *d* permits of the motion of the wheel in the direction of the arrow, but opposes its movement in the other direction.



Ratchet-wheel

Ratel′, or HONEY-BADGER, a carnivorous quadruped of the genus *Mellivŏra*, and of the badger family, found chiefly in South and East Africa, and in India. The Cape or South African ratel (*M. ratel*) averages about 3 feet in length, including the tail, which measures 8 or 9 inches in length.

The fur is thick and coarse, the colour is black on the under parts, on the muzzle, and limbs, whilst the tail, upper surface,

Honey-ratel (*Mellivora ratel*).

sides, and neck are of grayish hue. It is celebrated for the destruction it makes among the nests of the wild bee, to the honey of which it is very partial.

Rathenow, or RATHENAU (rä'te-nou), a town of Prussia, province of Brandenburg, about 44 miles W. and by N. of Berlin, on the Havel. It has a church of the 14th and 16th centuries, and various manufactures, especially of optical instruments, wooden wares, machinery, &c. Pop. 13,072.

Rathkeale (rath-kēl'), a market town of Ireland, in the county of Limerick, on the Deel, about 19 miles south-west of Limerick. Pop. 2073.

Rathlin, or RACHLIN, an island of Ireland, belonging to the county of Antrim, 5 miles N. of Ballycastle. On it are the remains of a castle, in which Robert Bruce took refuge when driven from Scotland in 1306. It is about 6½ miles long by 1½ broad; area, 3399 acres. Pop. 361.

Rat'ibor, a town of Prussia, in the government and 40 miles S.S.E. of Oppeln, on the left bank of the Oder, about 10 miles from the Austrian frontier. It has a gymnasium and deaf and dumb institute, &c.; and manufactures of machinery and other iron goods, sugar, paper, glass, tobacco, &c. Pop. 19,520.

Ratification, in law, the confirmation or approval given by a person arrived at majority to acts done by him during minority, and which has the effect of establishing the validity of the act which would otherwise have been voidable.

Ratio, the numerical measure which one quantity bears to another of the same kind, expressed by the number found by dividing the one by the other. The ratio of one quantity to another is by some mathematicians regarded as the quotient obtained by dividing the second quantity by the first; by others, as the quotient obtained by dividing the first by the second; thus the ratio of 2 to 4 or a to b may be called either $\frac{2}{4}$ and $\frac{a}{b}$ or $\frac{4}{2}$ and $\frac{b}{a}$. Proportion, in the mathematical sense, has to do with the comparison of ratios, proportion being the equality or similarity of ratios. Ratio in the above sense is sometimes called *geometrical ratio*, in opposition to *arithmetical ratio* or the difference between two quantities. Ratio is of various kinds: *Compound ratio.* When the one quantity is connected with two others in such a manner that if the first be increased or diminished the product of the other two is increased or diminished in the same proportion, then the first quantity is said to be in the *compound ratio* of the other two.—*Direct ratio.* When two quantities or magnitudes have a certain ratio to each other, and are at the same time subject to increase or diminution, if while one increases the other increases in the same ratio, or if while one diminishes the other diminishes in the same ratio, the proportions or comparisons of ratios remain unaltered, and those quantities or magnitudes are said to be in a *direct ratio* or proportion to each other. —*Inverse ratio.* When two quantities or magnitudes are such that when one increases the other necessarily diminishes, and vice versa when the one diminishes the other increases, the ratio or proportion is said to be *inverse.*

Ration, in the army and navy, the allowance of provisions given to each officer, non-commissioned officer, private, and sailor.

Rationalism is the doctrine which affirms the prerogative and right of reason to decide on all matters of faith and morals whatever so-called 'authority' may have to say on the matter. Rationalism has had perhaps its chief centre and widest success in Germany; but its source may fitly be found in the English deism of the 17th and 18th centuries. The first step taken by the English deists was to attempt to eliminate from the doctrines of Christianity whatever is above the comprehension of human reason; their next step was to discard from Christianity whatever in the way of fact was such as could not be verified by any man's experience, and this led to an attempt to get rid of Christianity altogether. German rationalism was also influenced by the writings of Voltaire, the Encyclopedists, and the sceptical freedom of thought which

obtained among the French *savants* at the court (1740–86) of Frederick the Great. It may be said to have begun with the translation into German of Tindal's Christianity as old as the Creation (1741), the application of a rationalistic method by Professor Wolff of Halle University to the philosophy of Leibnitz (1736–50), and the advent of Frederick the Great. The initial movements of rationalism were followed up by such scholars and theologians as Eberhard, Eichhorn, Paulus, Teller, and Steinbart. With the beginning of the century, however, a new development occurred when Schleiermacher published in 1799 his Discourses on Religion. In his teaching he sought to establish a distinction between the dry rationalism of the understanding and the spiritual rationalism of what he called the religious consciousness. Instead of accepting the Old and New Testaments as the supreme standard of religious truth Schleiermacher recognized them as only the recorded consciousness of the early church; instead of finding in revelation a divine mode of conveying doctrine, he found it to be that illumination which the human mind receives from historical personages who have a genius for religion. In this form of reconstructive rationalism he was followed by De Wette, Fries and Jacobi, and this second period continued until 1835. In this year Strauss published his Leben Jesu (Life of Jesus), a work in which, from the Hegelian stand-point, and in a destructive spirit, he discusses the origin of the New Testament. The movement which this originated has taken a tendency which is chiefly associated with scientific materialism, agnosticism, &c., and rationalism as a distinctive phase of religious controversy may be said to have then ceased.

Ra'tisbon (German, *Regensburg*), a town of Bavaria, capital of the province of Oberpfalz or Upper Palatinate, stands on the right bank of the Danube, opposite the junction of the Regen, 65 miles N.N.E. of Munich and 53 miles S.E. of Nuremberg; 1010 feet above the sea. It is very irregularly built, and the streets are generally narrow and winding. The houses are more remarkable for their venerable appearance than for architectural merit, though some of them are imposing, having once been residences of the mediæval nobles, and having towers intended for defensive purposes. There are, however, several spacious and handsome streets and squares, and numerous fountains. The most remarkable public buildings are the cathedral, founded in 1275, restored in 1830–38, a noble example of German Gothic, with a lofty and imposing front, flanked by two towers with open-work spires, and having a richly-sculptured portal; the Rathhaus, where the German diet held its sittings from 1645 to 1806; the Romanesque church of St. Emmeran; the palace of the princes of Thurn and Taxis (formerly abbey of St. Emmeran); the ducal and episcopal palace, the royal villa, the mint, theatre, synagogue, public library, antiquarian museum, picture-gallery, &c. The suburb Stadt am Hof, on the opposite bank of the Danube, is connected with Ratisbon by an old stone bridge. The manufactures embrace lead and coloured pencils, porcelain and stoneware, hosiery, woollen cloth, leather, machinery, hardware, gloves, sugar, and tobacco. There are also breweries and other works. The river trade is important. About 6 miles to the east is the celebrated Walhalla (which see). Ratisbon existed under the Celtic name of *Radasbona* in pre-Roman times, and was a Roman frontier fortress under the name of *Castra Regina*. Subsequently it became the residence of the old dukes of Bavaria, rose to the rank of an imperial city, and continued long to be the chosen seat of the imperial diets. The sieges which it has stood number no less than seventeen. Pop. 41,474.

Rati'tæ, Huxley's second division of the class of Aves or birds, the other two being the Saururæ and Carinatæ. See *Ornithology*.

Ratlam', a native Indian state, governed by a rajah and under the British Central Indian Agency; area, 729 sq. miles; pop. 89,160. It has a capital of the same name, which is the centre of the Malwa opium trade; pop. 29,822.

Rat'lines, small lines which traverse the shrouds of a ship horizontally, at regular distances of about 15 to 16 inches, forming a variety of ladders reaching upwards to the different mast-heads.

Ratna'giri, a maritime town of India, 140 miles S. by E. of Bombay, with a fort and lighthouse. Pop. 14,300.

Rat-snake, a snake destitute of poison-fangs (*Coryphodon Blumenbachii*), domesticated in Ceylon on account of its usefulness in killing rats. It can easily be tamed.

Rattans', the commercial name for the long trailing stems of various species of palm of the genus *Calămus*, such as *C.*

Rotang, C. rudentum, C. verus, &c., forming a considerable article of export from India and the Eastern Archipelago. They have all perennial, long, round, solid, jointed, unbranching stems, extremely tough and pliable. All the species are very useful, and are employed for wicker-work, seats of chairs, walking-sticks, thongs, ropes, cables, &c.

Rattany. See *Ratany*.

Rattaz'zi, URBANO, an Italian statesman, born 1808, died 1873. He practised as an advocate in his native Piedmont; in 1848 was returned as deputy to the Chamber at Turin; became leader of the democratic party, minister of the interior, and in 1849 practically head of the government. He was prominently unpopular in 1862 for his opposition to Garibaldi's advance on Rome.

Rattlesnake, a name of various venomous American snakes of the genus *Crotălus*, family Crotalidæ, distinguished from the other members of the family by the tail terminating in a series of articulated horny pieces, which the animal vibrates in such a manner as to make a rattling sound. The function of the 'rattle' is dubious. The rattlesnake, is one of the most deadly of poisonous serpents, but hogs and peccaries kill and eat it, finding protection in the thickness of their hides and the depth of their layers of fat. A number of species belong to the U. States and Mexico. East of the Mississippi the *C. horridus*, or banded rattlesnake, is the best known and most dreaded species. It is naturally a sluggish animal, ready to defend itself, but seldom commencing the attack. It feeds on rats, squirrels, small rabbits, &c., and reaches a length of 5 or 6 feet. Other species are the *C. durissus*, or striped rattlesnake, found from Mexico to Brazil; *C. adamanteus*, the diamond rattlesnake; *C. lucifer*, the western black rattlesnake; *C. confluentus*, the prairie rattlesnake; *C. cerastes*, the horned rattlesnake of the American deserts. Other rattlesnakes belong to the allied genus *Candisona*, as *C. tergemina*, the black rattlesnake; *C. miliria*, the ground rattlesnake.

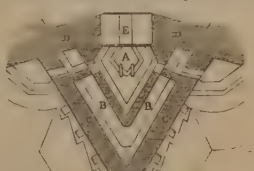
Rattlesnake-root, a name for *Polygăla Senĕga*, an American plant used to cure the bite of the rattlesnake.

Rattlesnake-weed, the American plant *Eryngium virginicum*, used as a cure for the bite of the rattlesnake.

Rauch (rouh), CHRISTIAN, one of the most distinguished of German sculptors, born at Arolsen 1777, died 1857. He received some instructions from the sculptor Ruhl, at Cassel, afterwards proceeded to Berlin to act as one of the royal lackeys, modelled a bust of the queen, and in 1804 went to Rome, where he made the acquaintance of Thorwaldsen and Canova, and obtained the patronage of Wilhelm von Humboldt. He received an invitation in 1811 from the King of Prussia to design a monument of Queen Louisa, and produced a noble work which established the fame of the artist. From this time onwards he was the sculptor of an immense number of works in all the branches of the statuary art. He was especially great in ideal figures and in portraiture. Among his *chefs d'œuvre* may be mentioned the monument of King Frederick William III. and Queen Louisa in the Charlottenburg mausoleum, the colossal equestrian statue of Frederick the Great at Berlin, having the base surrounded by groups of his most distinguished contemporaries, and forming altogether one of the most notable monuments in Europe; the six colossal figures of Victory in the Walhalla, and a group representing Moses with his hands supported by Aaron and Hur.

Ravaillac (rà-và-yàk), FRANÇOIS, the murderer of Henry IV. of France, born 1578. He commenced life as valet to an attorney, and afterwards became attorney's clerk, and schoolmaster. He afterwards took service in the order of the Feuillants, but was expelled as a visionary. His various disappointments and his religious fanaticism led him to plan the assassination of Henry IV., which he successfully accomplished 14th May, 1610. Upon this he was seized, horribly tortured, and put to death.

Rav'elin, a detached triangular work in



Ravelin.

fortification, with two embankments which form a projecting angle. In the figure BB is the ravelin with A its redout, and CC its

ditch, D D being the main ditch of the fortress, and E the passage giving access from the fortress to the ravelin.

Raven, a large bird of the crow family and genus *Corvus* (*C. corax*). Its plumage is entirely black; it is above 2 feet in length from the tip of the bill to the extremity of the tail, and about 52 inches from tip to tip of the extended wings. It can be taught to imitate human speech, and in a domestic state is remarkable for its destructiveness, thievishness, and love of glittering things. It flies high, and scents carrion, which is its favourite food, at the distance of several miles; it feeds also on fruit, small animals, &c. It is found in every part of the globe.

Ravena'la, a fine large palm-like tree of Madagascar, order Musaceæ (plantains), with leaves 6 to 8 feet long. It is called *travellers' tree*, because of the refreshing water found in the cup-like sheaths of the leaf-stalks. Its leaves are used for thatch and the leaf-stalks for partitions. The seeds are edible and the blue pulpy fibre surrounding them yields an essential oil.

Raven'na, a town of Italy, capital of the province of the same name, on the Montone, about 4 miles west of the Adriatic, and 43 miles east by south of Bologna. It stands in a marshy district, has a circuit of about three miles, and its streets are in general regular and spacious. The principal edifices are the cathedral, founded in the 4th but rebuilt during the 17th century, consisting of nave and aisles with a dome, and adorned with some of Guido's finest paintings; the ancient baptistery, an octagonal structure; the church of San Vitale, an octagonal building with a large dome in the pure Byzantine style, one of the earliest of Christian churches, having been consecrated in 547; the Basilica of San Giovanni Evangelista, founded in 414, but much altered by restoration; the church of San Apollinare Nuovo (or San Martino), an excellent specimen of the ancient basilica; the mausoleum of the empress Galla Placidia, daughter of Theodosius the Great, dating from the 5th century; the palace of Theodoric, king of the Ostro-Goths; the tomb of Dante; the town-house, library, museum, &c. The manufactures are of little importance. Its harbour was in early times large enough to contain the fleets of Augustus, but it gradually silted up. It is now connected with the Adriatic by the Canale Naviglio at Porto-Corsini. Ravenna is an ancient place, and during the decline of Rome, A.D. 404, Honorius made it the seat of the Western Empire. In his reign and the regency of his sister Placidia it was adorned with many of its noblest edifices. Thereafter it fell into the hands of Odoacer, who in his turn was expelled by Theodoric, under whom it became the capital of the Goths. It was recaptured by Belisarius, who made the town and its territory an exarchate. This exarchate was terminated by Astolphus, king of the Lombards, who made Ravenna the metropolis of the Longobardic Kingdom in 752. Pepin and Charlemagne, having succeeded in expelling the Lombards, made a present of Ravenna and its exarchate to the pope, with whom it remained till 1860. Pop. 18,571, or as commune 60,573. The province has an area of 820 sq. miles; pop. 225,764.

Ravensburg, an old town of Würtemberg, in a valley on the Schussen, 22 miles E.N.E. of Constance. It is irregularly built, and has manufactures of paper, silk, flax, cotton, &c. Pop. 11,480.

Ravenscroft, THOMAS, English composer, born in 1592, died 1640. He was trained in St. Paul's choir, and received the degree of bachelor of music from Cambridge. In 1611 he published a collection of twenty-three part-songs, under the title of Melismata; in 1614 appeared another collection of part-songs, prefixed by an essay; and in 1621 he published his Whole Book of Psalms, containing a tune for each of the 150 psalms, harmonized in four parts by all the great musicians of the period.

Rawal Pindi, a town of British India, in the Punjab, situated in the district between the Indus and the Jhilam. It has an arsenal, extensive cantonments, and important military works, churches, schools, public park, &c. It is on the railway from Lahore to Peshawar, and carries on a thriving transit trade between Hindustan and Afghanistan. Pop. 73,795.

Rawicz (rä'vich), or RAWITSCH, a town of Prussia, in the government and 55 miles south of Posen. It has manufactures of machinery, furniture, &c., and a trade in corn, cattle, and wool. Pop. 12,920.

Rawlinson, REV. GEORGE, born in 1815; educated at Trinity College, Cambridge; took a first-class in classics; became public examiner in 1854; preached the Bampton Lectures in 1859; was elected Camden professor of ancient history in 1861, and made a canon of Canterbury in 1872. Besides

various short works on antiquity he has published a translation of Herodotus with a commentary (1858–60); The Five Great Monarchies of the Ancient Eastern World (4 vols. 1862–67), followed by the Sixth (1873) and the Seventh Oriental Monarchy (1876); History of Ancient Egypt (2 vols. 1881); Egypt and Babylon (1885); Phœnicia (1889), &c.

Rawlinson, Sir Henry Creswicke, G.C.B., brother of the above, born in 1810; educated at Ealing School; entered the Bombay army in 1827; went on a diplomatic mission to Persia in 1833; proceeded afterwards to Afghanistan as political agent; became consul at Bagdad in 1844; a member of the Indian Council in 1858; sat in the House of Commons in 1865–68; and was appointed president of the Royal Geographical Society 1871–76. He has published A Commentary on the Cuneiform Inscriptions of Babylon and Assyria (1850); Outline of the History of Assyria (1852); Notes on the Early History of Babylon (1854); and the Cuneiform Inscriptions of Western Asia, edited along with E. Norris and G. Smith (5 vols. 1861–70). He was D.C.L. of Oxford, LL.D. of Cambridge, F.R.S., and a corresponding member of the French Institute. He died in 1895.

Rawmarsh, a town of England in Yorkshire, in the south of the W. Riding, 2 miles from Rotherham, with iron-works and collieries. Pop. 11,983.

Rawtenstall, a town of England in Lancashire, 8 miles north of Bury, with cotton and woollen manufactures. Pop. 29,507.

Ray, a family of elasmobranchiate fishes, including the skate and allied forms, recognized by the flattened body and by the extremely broad and fleshy pectoral fins, which seem to be mere continuations of the body. These fishes produce large eggs which are inclosed in cartilaginous capsules quadrilateral in form, with processes at the corners, and known familiarly as 'mermaids' purses,' &c. The most common members of this group are the thornback ray or skate (*Raia clavāta*), so named from the curved spines which arm the back and tail; and the common gray or blue skate (*R. batis*), which possesses an acutely-pointed muzzle, the body being somewhat lozenge-shaped, and the colour ashy-gray above. The starry ray (*R. radiāta*) is so called from having a number of spines on its upper surface rising from rayed or starlike bases; it reaches a length of 30 inches. The sting ray (*Trygon pastināca*) occurs in the Mediterranean Sea, but is also found on the British coasts, having the tail armed with a long spine, serving as a means of defence. The horned ray (*Cephaloptera Giorna*) common in the Mediterranean Sea, attains occasionally a large size.

Starry Ray (*Raia radiāta*).

Ray, John, English naturalist, born 1628, died 1705. He was educated at Cambridge, where he was successively appointed Greek lecturer, mathematical lecturer, and humanity reader, but resigned his fellowship rather than sign the Act of Uniformity. Accompanied by his friend and former pupil, Francis Willughby, he travelled over the greater part of the British Islands and the Continent collecting botanical and zoological specimens. Finally he settled at his birthplace, Black-Notley, Essex. In 1667 he was elected a member of the Royal Society. His chief scientific works are: Methodus Plantarum Nova (London, 1703, 8vo); Historia Plantarum Generalis (three vols. folio, 1686–1704); Synopsis Methodica Animalium Quadrupedum et Serpentini Generis Vulgarium (1693, 8vo); Historia Insectorum (1710, 4to); Synopsis Methodica Avium et Piscium (1713, 8vo); the Ornithologia of Willughby, arranged and translated (1676, three vols.); also an edition of his friend's Historia Piscium (1686, two vols. folio). Besides his numerous scientific writings, Ray published several works on divinity and other subjects, the best known of which are: The Wisdom of God manifested in the Works of the Creation, a work which has run through many editions; Collection of English Proverbs; Collection of Travels and Voyages, &c. In 1844 a society named after Ray, the *Ray Society*, was formed in London for the promotion of natural history by the printing of original works, new editions, rare tracts, translations, &c., relating to botany and zoology, and which has issued a large number of valuable works.

Rayleigh, John William Strutt, Lord, D.C.L., LL.D., F.R.S., born 1842, was educated at Trinity College, Cambridge, where

he was senior wrangler and first Smith's prizeman in 1865. He was president of the British Association in 1884–85, was professor of experimental physics at Cambridge, and succeeded Professor Tyndall as professor of natural philosophy at the Royal Institution (in 1887). Author of Theory of Sound, &c.

Raynouard (rā-nō-är), FRANÇOIS JUSTE MARIE, French poet and philologist, born at Brignoles, Provence, 1761; died 1836. He studied for the bar; was elected as a deputy to the Legislative Assembly; took part in the revolution and the affairs of the first empire; and became a member of the Corps Legislatif. He wrote several tragedies, such as Scipion, Don Carlos, Charles I., Les Templiers, but he is chiefly remembered as a philologist who revived the study of Provençal by his Choix des Poesies originales des Troubadours (1816–21, six vols. 8vo); Lexique Roman, ou Dictionnaire de la Langue des Troubadours (1836–44, six vols. 8vo); Grammaire Comparé des Langues de l'Europe Latine dans leurs Rapports avec la Langue des Troubadours (1821, 8vo).

Razor, the well-known keen-edged steel instrument for shaving off the beard or hair. The edge and back of the blade are more or less curved, and the sides are slightly hollowed in grinding. It is usually made with a tang, which is fastened to the handle by a rivet. The handles are made of a great variety of materials. The great centre of the razor manufacture is Sheffield. The savages of Polynesia still use two pieces of flint of the same size, or pieces of shells or sharks' teeth ground to a fine edge for shaving.

Razor-back, one of the largest species of the whale tribe, the *Balænoptera* or *Rorqualus borealis*, the great northern rorqual. See *Rorqual*.

Razor-bill, an aquatic bird, the *Alca torda* or common auk. See *Auk*.

Razor-fish, a species of fish with a compressed body, much prized for the table. It is the *Coryphæna novacula*.

Razor-shell (*Solen*), a genus of lamellibranchiate mollusca, forming the type of the family Solenidæ. The razor-shells are common on British sea-coasts; the shells are sub-cylindrical in shape; the hinge-teeth number two on each valve; and the ligament for opening the shells is long and external in position. The mantle is open in front, to give exit to the powerful muscular 'foot,' used by these molluscs for burrowing swiftly into the sandy coasts which they inhabit. The familiar species are the *Solen siliqua*, *S. ensis*, *S. vagina*, *S. marginatus*, and *S. pellucidus*.

Razzi, GIOVANNI ANTONIO (GIANANTONIO), surnamed *Sodoma*, Italian painter, born in 1479 at Vercelli in Piedmont, died 1549 or 1554. At an early age he was brought to Siena, and as most of his life was spent there he is considered one of the painters of the Sienese school. He painted chiefly in fresco, and was employed by Julius II. to decorate in the Vatican, but his best work is in the churches of Siena.

Ré, or RHÉ (rā), ILE DE, an island of France, in the Bay of Biscay, about 2 miles off the coast of department Charente-Inférieure, 6 miles west of Rochelle; greatest length, 18 miles; breadth, nearly 4 miles; area, 18,250 acres. The coasts on the south and west are lofty and precipitous, but there are several good harbours. Pop. 17,500.

Reaction, in physics, counteraction, the resistance made by a body to the action or impulse of another body, which endeavours to change its state, either of motion or rest. It is an axiom in mechanics that 'action and reaction are always equal and contrary,' or that the mutual actions of two bodies are always equal and exerted in opposite directions. In chemistry, the term is applied to the mutual or reciprocal action of chemical agents upon each other. In pathology, reaction is the action of an organ which reflects upon another the irritation previously transmitted to itself.

Reade (rēd), CHARLES, novelist, son of Mr. John Reade of Ipsden House in Oxfordshire, born in 1814, died 1884. He was educated at Magdalen College, Oxford, where he took the B.A. degree, and he was called to the bar in 1843. He became first known by his novel of Peg Woffington, which he afterwards dramatized in conjunction with Tom Taylor under the title of Masks and Faces. This was followed by Christie Johnstone, and Never Too Late to Mend, one of his 'novels with a purpose,' in which he attacked the English prison system. The most scholarly and artistic of his writings, The Cloister and the Hearth, dealing with the lives of the parents of Erasmus, appeared in 1861, and among the more important of his other works are :—The Course of True Love never did run Smooth, Love Me Little Love Me Long, White Lies, Hard Cash, Griffith Gaunt, Put Yourself in His Place, A Terrible Temptation, Singleheart and Doubleface, A Perilous Secret, &c. He is also the

author, either alone or in collaboration with others, of the following dramas:—Gold, Two Loves and a Life, The King's Rivals, Foul Play, &c.

Reader, specifically, one whose office it is to read prayers, lessons, lectures, and the like to others; as, (*a*) in R. Cath. Ch. one of the five inferior orders of the priesthood; (*b*) in Eng. Church, a deacon appointed to perform divine service in churches and chapels, of which no one has the cure. (*c*) A kind of lecturer or professor in universities, &c. (*d*) In printing offices, a person who reads and corrects proofs. See *Printing*.

Reading (red'ing), a parliamentary and municipal borough of England, capital of the county of Berks, on the Kennet, near its confluence with the Thames, 36 miles west of London. The town is well built and laid out, and there are an assize hall, the Royal Berkshire hospital, a town-hall of recent erection in the Renaissance style, a grammar-school, &c. The industrial establishments include a large and celebrated biscuit factory, iron foundries, breweries, corn-mills, &c., and there is a considerable agricultural trade. There are interesting remains of a magnificent abbey founded by Henry I., who was buried within its precincts in 1135. Reading sends one member to parliament. Pop. 60,054.

Reading, a city, United States, Berks county, Pennsylvania, on the left bank of the Schuylkill, 52 miles north-west of Philadelphia. The chief industries are muslin and woollen goods, felt hats, iron-founding, tanning, &c. Pop. 58,661.

Rea'gent, in chemical analysis, a substance employed as a test to determine the presence of some other substance. Thus, the infusion of galls is a reagent which detects iron by a dark purple precipitate; the prussiate of potash is a reagent which exhibits a blue with the same metal, &c.

Real, in law, pertaining to things fixed, permanent, or immovable. Thus *real estate* is landed property, including all estates and interest in lands which are held for life or for some greater estate, and whether such lands be of freehold or copyhold tenure. So a *real action* is an action brought for the specific recovery of lands, tenements, and hereditaments.

Real', a Spanish silver coin worth nearly 2½*d*. English. In the course of exchange 100 reals are rated at £1 sterling. The real is also a Portuguese money of account, equal to 40 reïs, or about 2*d*. English money.

Real'gar, a mineral consisting of a combination of sulphur and arsenic in equal equivalents; red sulphuret of arsenic, which is found native.

Realism, in metaphysics, as opposed to *idealism*, the doctrine that there is an immediate or intuitive cognition of external objects, while according to idealism all we are conscious of is our ideas. According to realism external objects exist independently of our sensations or conceptions; according to idealism they have no such independent existence. As opposed to *nominalism*, it is the doctrine that asserts that general terms like *man*, *tree*, &c., are not mere abstractions, but have real existences corresponding to them. In the middle ages there was a great controversy between the realists and the nominalists, the chief controversy which divided the schoolmen into rival parties. The realists maintained that things and not words are the objects of dialectics. Under the denomination of realists were comprehended the Scotists and Thomists, and all other sects of schoolmen, except the followers of Occam and Abelard, who were nominalists.

Real Presence, the doctrine of the actual presence of the body and blood of Christ in the eucharist. See *Consubstantiation*, *Transubstantiation*.

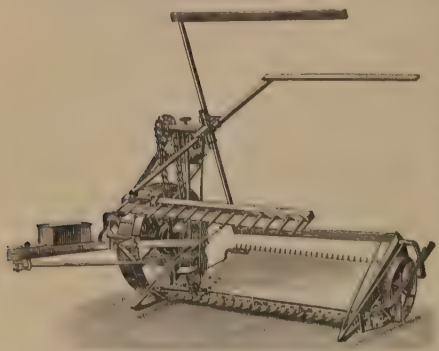
Real Schools (German, *Realschulen*) are those educational institutions of Germany between the elementary school and the university having for their special object the teaching of science, art, the modern languages, &c.; in contradistinction to the ordinary grammar-schools and gymnasiums, in which the classical languages hold a more important place.

Ream, a quantity of paper, consisting of 20 quires of 24 sheets each. The printer's ream consists of 21½ quires, or 516 sheets.

Reaping-hook, or SICKLE, a curved metal blade with a cutting edge on the inner side of the crescent, and set in a wooden handle, used for cutting down corn, grass, &c. It is about 18 inches in length, and tapers from a breadth of about 2 inches at the handle down to a more or less sharp point.

Reaping-machine, or REAPER, a machine for cutting down standing corn, &c., usually worked by a pair of horses, the cutting machinery being driven by being connected with the wheels on which the machine is drawn over the field. The cutting is effected rather in the manner of a pair of scissors than in that of a scythe, and a series of small

toothed wheels have to be connected with the main wheel or wheels so as to produce the fast motion necessary for driving the cutting knives. These knives generally consist of triangular pieces of steel riveted to an iron bar, and are sometimes smooth-edged and sometimes tooth-edged. The knife-bar projects horizontally from the side of the machine at a short distance above the ground, and moves backwards and forwards on guides fixed at the back of a number of pointed fingers, which enter the standing grain and guide the straw to the edges of the knives. The motion of the bar being very rapid, the grain is cut down with corresponding speed, and as it is cut it is received on a platform fixed behind the knife-bar. In most cases a revolving rake with four inclined arms is attached to such machines, and set in motion by the driving-wheel. Two of the arms bring the corn well on to the knife-bar, and the others deliver the corn cut at the back of the machine. Many of the recent machines are also fitted with a binding apparatus. An endless apron receives the grain as it is cut, and deposits it in a trough on the outer side of the machine. By an ingenious mechanical arrangement the loose straw is caught and compressed by two iron arms; wire from a reel is passed round the sheaf, fastened by twisting, cut away, and the bound sheaf is tossed out of the trough by one of the arms by which it was compressed. Other apparatus are constructed so as to bind with cord, straw rope, &c. See *Agriculture*.



Single-wheel Back-delivery Reaping-machine.

Reason, a faculty of the mind by which it distinguishes truth from falsehood, and which enables the possessor to deduce inferences from facts or from propositions, and to combine means for the attainment of particular ends. Reason is the highest faculty of the human mind, by which man is distinguished from brutes, and which enables him to contemplate things spiritual as well as material, to weigh all that can be said or thought for and against them, and hence to draw conclusions and to act accordingly. In the language of English philosophy the terms reason and understanding are sometimes nearly identical, and are so used by Stewart; but in the critical philosophy of Kant a broad distinction is drawn between them.

Réaumur (rā-ō-mür), René Antoine Ferchault de, French physicist and naturalist, born in 1683 at La Rochelle, died 1757. He studied under the Jesuits at Poitiers and afterwards at Bourges; went to Paris in 1703; in 1708 he was chosen a member of the Academy of Sciences; and for nearly fifty years he continued to be one of its most active members. As a natural philosopher he is celebrated for the invention of an improved thermometer, which he made known in 1731 (see *Thermometer*); but his greatest work is the Mémoires pour servir à l'Histoire Naturelle des Insectes, 6 vols.

Rebec', an old stringed instrument somewhat similar to the violin, having properly three strings tuned in fifths, and played with a bow. It was of Arabian or Turkish origin and was introduced by the Moors into Spain.

Rebec of the sixteenth century.

Rebecca, a title given to the leader of an anti-turnpike conspiracy which was commenced in Wales, in 1839, by breaking down the turnpike-gates. The leader and his followers, who were generally dressed in women's clothes, were called 'Rebecca and her daughters,' and made their attacks by night on horseback. The name was derived from a strange application of a passage in Genesis xxiv. 60.

Rebellion, the taking up of arms, whether by natural subjects or others, residing in the country, against a settled government. By international law rebellion is considered a crime, and all persons voluntarily abetting it are criminals whether subjects or foreigners. When a rebellion has attained such dimensions and organization as to make of the rebel party a state *de facto*, and its acts reach the dimensions of war *de facto*, it is now the custom of the state to yield to the rebels such belligerent privileges as policy and humanity require, and to treat captives as prisoners of war, &c.

Rebus, a group of words or a phrase written by figures or pictures of objects whose names resemble in sound the words or the syllables of which they are composed; thus, 'I can see you' might be expressed by figures or pictures of an eye, a can, the sea,

Rebus of Abbot Islip, Westminster Abbey.

Rebus of Bishop Oldham, Exeter Cathedral.

and a ewe. In heraldry a rebus is a device on a coat of arms conveying an allusion to the name of the person, as castles for Castleton, three cups for Butler. The accompanying cuts show rebuses on personal names (not very happy attempts, however), the one standing for the name *Oldham* (*Owldom*), the other for *Islip*. *I slip* may be obtained several ways, as from the eye and the slips on the tree; or the figure may be supposed to say 'I slip,' or the hand to belong to a person slipping.

Récamier (rā-kà-mi-ā), JEANNE FRANÇOISE JULIE ADÉLAÏDE, whose maiden name was Bernard, born at Lyons 1777, died 1849. At the age of sixteen she went to Paris, and was there married to Jacques Récamier, a rich banker, more than double her own age. From this time her aim was to surround herself with personal admirers, and to attract to her salon the chief personages in French literature and politics. Her husband becoming bankrupt, she went to reside with Madame de Staël in Switzerland, but in 1811 was banished from Paris by Napoleon on account of her intimacy with his enemies. At the downfall of Napoleon she returned to Paris, and again opened her salon, which as before continued to be a resort of men of intellect till her death. She had very intimate relations with Benjamin Constant and Chateaubriand.

Recana'ti, a town of Italy, province of Macerata, situated between Ancona and Rome. It contains many fine palaces, a Gothic cathedral, and a monument to Leopardi, who was born here. Pop. 12,517.

Recaption, in law, the retaking, without force or violence, of one's own goods, chattels, wife, or children from one who has taken them and wrongfully detains them.

Receipt, a written acknowledgment or account of something received, as money, goods, &c. A receipt of money may be in part or in full payment of a debt, and it operates as an acquittance or discharge of the debt only as far as it goes. In Britain if a receipt for a sum of £2 or upwards does not bear the penny government stamp it is inadmissible as evidence of payment. The stamp may be either adhesive or impressed on the paper. Formerly there were special adhesive receipt stamps, but the penny postage stamp now serves also for receipts.

Receiver, in England, a person appointed by the Court of Chancery to receive the rents and profits of land, or the produce of other property, which is in dispute in a cause in that court. The name is also given to a person appointed in suits concerning the estates of infants, or against executors, or between partners in some business for the purpose of winding up the concern.

Receiver of Stolen Goods, one who takes stolen goods from a thief, knowing them to be stolen, and incurs the guilt of partaking in the crime. Receivers of property when the theft amounts to felony are liable to penal servitude from three to fourteen years, or imprisonment for two years; if the stealing is only a misdemeanour, the receiver is subject to penal servitude from three to seven years, or to imprisonment for not above two years.

Recent Formation, in geology, the name given to the latter of the two subordinate groups into which the Post-tertiary formation has been divided, the former or earlier being the Post-pliocene. This 'recent' group includes all superficial accumulations, as sand, gravel, silt, marl, peat-moss, coral reefs, &c., from the close of the glacial or boulder-drift period down to and comprising those accumulations that are still in process of being formed.

Recep'tacle, in botany, the name usually given to that part of a flower upon which the carpels are situated. But the term *receptacle* is used by botanists in different senses. Thus, it is used to signify the axis of the theca among ferns; that part of the ovary from which the ovules arise, commonly called the *placenta;* and also that part of the axis of a plant which bears the flowers when it is depressed in its development.

Rechabite, among the ancient Jews, one of a family or tribe of Kenites whom Jonadab the son of Rechab bound to abstain from wine, from building houses, from sowing seed, and from planting vines (see Jer. xxxv. 6, 7). In modern application the Rechabites are a benefit society composed of total abstainers from intoxicating drinks, called the Independent Order of Rechabites.

Recife (re-sē'fā). See *Pernambuco.*

Recip'rocal, a term in mathematics. The reciprocal of a quantity is the quotient resulting from the division of unity by the quantity; thus, the *reciprocal* of 4 is $\frac{1}{4}$, and conversely the *reciprocal* of $\frac{1}{4}$ is 4; the *reciprocal* of 2 is $\frac{1}{2}$, and that of $a+x$ is $\frac{1}{a+x}$.

Reciproc'ity, a term in economics commonly applied in international relationships to the arrangement whereby two nations mutually agree to import to each other certain goods, either duty free or with duties which are equivalent. See *Free-trade.*

Recit'ative, a species of vocal composition which differs from an air in having no definite rhythmical arrangement, and no decided or strictly constructed melody, but approaches in tonal succession and rhythm to the declamatory accents of language. It is used in operas, oratorios, &c., to express some action or passion, or to relate a story or reveal a secret or design. There are two kinds of recitative, *unaccompanied* and *accompanied.* The first is when a few occasional chords are struck by an instrument or instruments to give the singer the pitch, and intimate to him the harmony. The second, which is now the more common, is when all, or a considerable portion, of the instruments of the orchestra accompany the singer.

Reclaiming, in Scots law, the process of appealing from a judgment of the lord-ordinary to the inner house of the Court of Session. A *reclaiming note* is the petition of appeal to the inner house craving the alteration of the judgment reclaimed against.

Reclus (rē-klü), Jean Jacques Elisée, French geographical writer, born 1830. He left France in 1851 and spent several years in travel. He has published a great number of works, the results of his voyages and geographical researches. Among his chief works are La Terre, the English edition of which, The Earth, has been very popular, and an exhaustive Géographie Universelle, or description of the earth, in 19 large vols. (1875–94). Being an extreme democrat, he became involved in the Paris commune of 1871, and was sentenced to transportation for life, but was amnestied in 1879. He has earned a certain notoriety from his extreme views on social questions.

Recog'nizance, in law, an obligation of record which a man enters into before some court of record, or magistrate duly authorized, with particular conditions; as to appear at the assizes or quarter-sessions, to keep the peace, &c.

Recollet (rek'o-lā), or **Rec'ollect, Friars or Nuns**, the name given to a reformed body of Franciscans. The society was founded in Spain, and thence spread throughout Europe, so that in France, before the revolution, they had 168 houses. The order still exists at a few places.

Recon'naissance, in military affairs, an examination of a territory or of an enemy's position, for the purpose of directing military operations. The term is also used in geodetics, &c., a reconnaissance being an examination of a region as to its general natural features, preparatory to a more particular survey, as for determining the location of a road, a railway, a canal, or the like.

Rec'ord, specifically, an official copy of any writing, or account of any facts and proceedings, whether public or private, entered in a book for preservation. In a popular sense the term *records* is applied to all public documents preserved in a recognized repository. The public records of England have been regularly preserved since 1100. Scottish records are preserved in Edinburgh, Irish in Dublin, and the English at the Record office, Fetter Lane, London. The act of 1838 conferred the guardianship of the English records on the master of the rolls, who in 1857 began the publication of the valuable series of chronicles and memorials known as the Rolls Series. In the legal sense of the term *records* are authentic testimonies in writing, of judicial acts and proceedings, contained in rolls of parchment,

and preserved, the courts of which the proceedings are thus preserved being called *courts of record*. In Scots law the record consists of the written statements or pleadings of parties in a litigation, and the 'closing of the record' is a formal step, sanctioned by the judge, after each party has put forward all he wishes to say by way of statement and answer.

Recor'der, in England, the chief judicial officer of a borough or city, exercising within it, in criminal matters, the jurisdiction of a court of record, whence his title is derived. The appointment of recorders is vested in the crown, and the selection is confined to barristers of five years' standing. The same name is given to similar legal functionaries elsewhere, as in certain colonial settlements.

Recorder, a musical instrument, formerly popular in Great Britain, resembling a flageolet in shape. The instrument was wider in the lower half than in the upper; its tones were soft and pleasing, and an octave higher than the flute.

Recruiting. See *Enlistment*.

Rectangle, a right-angled parallelogram, or a quadrilateral figure having all its angles right angles and its opposite sides equal. Every rectangle is said to be *contained* by any two of the sides about one of its right angles.

Rectify, in chemistry, to refine by repeated distillation or sublimation, by which the fine parts of a substance (as some kind of spirits) are separated from the grosser. To rectify liquors, in the spirit trade, is to convert the alcohol produced by the distiller into gin, brandy, &c., by adding flavouring materials to it. Thus in order to convert the spirit into London gin, juniper berries and coriander seeds are added previous to the last rectification. Œnanthic ether and other things give the flavour of brandy.

Rector, in the English Church, a clergyman who has the charge and cure of a parish, and has the parsonage and tithes; or the parson of a parish where the tithes are not impropriate. The heads of Exeter and Lincoln Colleges, Oxford, are also so called, and the chief elective officer of the Scottish universities receives the same title. In Scotland it is also the title of the head-master of an academy or important public school.

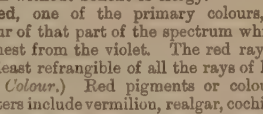
Rectum, in anatomy, the third and last part of the large intestine opening at the anus: so named from an erroneous notion of the old anatomists that it was straight.

Recurring Series, in algebra, a series in which the coefficients of the successive powers of x are formed from a certain number of the preceding coefficients according to some invariable law. Thus $a+(a+1)x+(2a+2)x^2+(3a+3)x^2+(5a+5)x^2+\ldots$ is a recurring series.

Rec'usants, in English history, after the Reformation, a person who refused or neglected to attend divine service on Sundays and holidays in the Established Church, or to worship according to its forms. Heavy penalties were formerly inflicted on such persons, but they pressed far more lightly on the simple recusant or nonconformist than on the R. Catholic recusant. In 23 Elizabeth the fine was made for every month £20; and later in the same reign it was enacted that if recusants did not submit within three months after conviction they might, upon the requisition of four justices of the peace, be compelled to abjure and renounce the realm; and if they did not depart, or if they returned without due license, they were to be treated as felons, and suffer death without benefit of clergy.

Red, one of the primary colours, the colour of that part of the spectrum which is farthest from the violet. The red rays are the least refrangible of all the rays of light. (See *Colour*.) Red pigments or colouring matters include vermilion, realgar, cochineal, lakes and madders, coal-tar colours, &c. The different forms of oxide of iron are *Indian red*, which is pure, finely ground hæmatite; *Venetian red* and *colcothar*, which are coarser forms of the same substance. *Minium* or lead oxide, and another form of the same substance containing a little carbonate, are known as *Paris red*.

Red Admiral Butterfly (*Vanessa Atalanta*), the popular name of a common British butterfly. The anterior wings are marked by a broad red band, outside of which are six white markings, while a bluish streak follows the wing-margin. The posterior wings are bordered with red, dotted with



Redans.

black spots, and have two bluish markings on the inner angles.

Redan', in field fortification, the simplest kind of work employed, consisting of two

parapets of earth raised so as to form a salient angle, with the apex towards the enemy and unprotected on the rear. Several redans connected by curtains form lines of intrenchment.

Red-bird, the popular name of several birds in the U. States, as the *Tanagra æstīva* or summer red-bird, the *Tanagra rubra*, and the Baltimore oriole or hang-nest.

Red-book, a book containing the names of all the persons in the service of the state. The *red-book of the exchequer* is an ancient English record in which are registered the names of all that held lands per baroniam in the time of Henry II.

Redbreast, or Robin Redbreast (*Erythăcus rubecŭla*), a species of bird belonging to the Dentirostral section of the Insessores, and to the family Sylviadæ, or warblers. The red breast of the male is the distinguishing feature of these well-known birds, the female possessing the breast of a duller yellowish-brown colour. The young are of a dull yellowish-green colour, and want the characteristic breast-colouring of the adult. In Britain the redbreast is a permanent resident, but in more northern countries it appears to be migratory, flying southwards in winter. It is a permanent bird in all the temperate parts of Europe, and it also occurs in Asia Minor and in North Africa. The nest is made of moss and leaves, and is lined internally with feathers. The eggs number five or six, and are white, spotted with pale brown. The robin redbreast of America is a thrush, the *Merŭla migratoria*, congeneric with the British blackbird; and one of the bluebirds, the *Sialia sialis*, is usually called the blue robin. The species of the Australian genus *Petrœca*, allied to the wheatears, and remarkable for their bright plumage, are called by the colonists 'robins.'

Red Cedar, a species of juniper (*Junipĕrus virginiāna*) found in North America and the West Indies; the heartwood is of a bright red, smooth, and moderately soft, and is in much request for the outsides of black-lead pencils.

Red Chalk. See *Reddle.*

Red Coral (*Corallium rubrum*), an important genus of sclerobasic corals belonging to the order Alcyonaria. Red coral is highly valued for the manufacture of jewelry, and is obtained from the coasts of Sicily, Italy, and other parts of the Mediterranean.

Red Cross Societies were established immediately after the Geneva Convention of 1863 for the purpose of assisting the wounded in time of war, and a central international committee maintains the connection between the various societies. The distinctive badge of the societies is a red Maltese cross on a white ground. (See *Geneva Convention.*)—The order of the Royal Red Cross was instituted by Queen Victoria in 1883 as a reward for ladies who have devoted themselves to the work of nursing the sick and wounded in war. The decoration consists of a red Maltese cross bearing the words 'Faith, Hope, and Charity.'

Red Currant (*Ribes rubrum*), a deciduous shrub much cultivated for its fruit, indigenous in the northern portions of Europe and America. The juice of the fruit is used for making jelly, and a well-known fermented liquor called currant wine.

Red-deer. See *Stag.*

Red'ditch, a town, England, county of Worcester, 12½ miles S.S.W. of Birmingham. It is irregularly but generally well built, and has manufactures of needles, hooks and eyes, and fishing-tackle. Pop. 11,295.

Reddle, Raddle, Ruddle, or Red Chalk, a species of argillaceous ironstone ore. It occurs in opaque masses, having a compact texture. It is used as a pigment of a florid colour, but not of a deep red. Sheep are generally marked with it.

Redeemable Rights, in law, those conveyances in property or in security which contain a clause whereby the granter, or any other person therein named, may, on payment of a certain sum, redeem the lands or subjects conveyed.

Redemption, in theology, the purchase of God's favour by the sufferings and death of Christ; the ransom or deliverance of sinners from the bondage of sin and the penalties of God's violated law by the atonement of Christ.

Redemption, Equity of. See *Equity.*

Redempt'orists, a religious congregation founded in Naples by Liguori in 1732. They devote themselves to the education of youth and the spread of R. Catholicism. They style themselves members of the congregation of the Holy Redeemer. By the law of 1872 they were expelled from Germany, and in 1880 France treated them in the same way. They are called also *Liguorists.*

Red-fish, a species of fish (*Sebastes marinus*) found on the Atlantic coast of North America, a large red fish caught in considerable numbers for food. A smaller species (*S. vivipărus*) receives the same name, and

is called also *Red-perch*, *Rose-fish*, &c. The bergylt (which see) is closely akin.

Redgrave, RICHARD, R.A., born in London in 1804, died 1888; became a student of the Royal Academy in 1826; his first notable picture was Gulliver at the Farmer's Table; in 1840, when he exhibited The Reduced Gentleman's Daughter, he was elected an Associate, and in 1851 became a Royal Academician. Among his other pictures may be named The Moor-hen's Haunt (1847); The Trout's Dark Haunt (1848); The Solitary Pool (1849); The Attiring of Griselda (1850); The Poet's Study (1851); An Old English Homestead (1854). From being head-master of the Government School of Design he became inspector-general of art schools, and arranged the Museum of Art at South Kensington. He was joint author with his brother of A Century of Painters (1866). Among his later pictures were Sermons in Stones (1871); The Oak of the Mill Head (1876); Friday Street, Wotton (1878); and Hidden Among the Hills (1881). —His brother SAMUEL, born 1802, died 1876, is chiefly known for his Dictionary of Artists of the British School.

Red Gum, the popular name of a florid eruption usually occurring in infants before and during first dentition, and appearing on the most exposed parts, as the face, neck, arms, and hands. It is almost always an innocent disease, and seldom lasts over a month.

Red Gum-tree, one of the Australian Eucalypti (*Eucalyptus resinifĕra*), yielding a gum-resin valued for medicinal uses.

Red Hand, in heraldry, originally the arms of the province of Ulster, but granted to baronets as their distinguishing badge on the institution of the order in 1611. It consists of a sinister (or left) hand, open, erect, showing the palm.

Red Indians. See *Indians.*

Red-lead (Pb_3O_4), an oxide of lead produced by heating the protoxide in contact with air. It is much used as a pigment, and is commonly known as *Minium.*

Red Ochre, a name common to a variety of pigments, rather than designating an individual colour, and comprehending Indian red, light red, Venetian red, scarlet ochre, Indian ochre, reddle, bole, and other oxides of iron. As a mineral it designates a soft earthy variety of hæmatite.

Redon (rĕ-dōn), a town of France, department of Ille-et-Vilaine, on the Vilaine, where joined by the Oust. Pop. 4847.

Redondillas (red-on-dil'yas), the name given to a species of versification formerly used in the south of Europe, consisting of a union of verses of four, six, and eight syllables, of which generally the first rhymed with the fourth and the second with the third. At a later period verses of six and eight syllables in general, in Spanish and Portuguese poetry, were called *redondillas*, whether they made perfect rhymes or assonances only.

Red Orpiment. Same as *Realgar.*

Redout', in fortification, a general name for nearly every class of works wholly inclosed and undefended by re-entering or flanking angles. The word is, however, most generally used for a small inclosed work of various form—polygonal, square, triangular, or even circular, and used mainly as a temporary field work.

Red Pine, a species of pine (*Pinus rubra*), also called *Norway Pine.* Its wood is very resinous and durable, and is much used in house and ship-building. It produces turpentine, tar, pitch, resin, and lampblack.

Red-pole, RED-POLL, a name given to several species of linnets. The greater red-pole is the *Linōta cannabīna;* the mealy red-pole is the *L. borĕālis* or *canescens;* and the little red-pole is the *L. linaria.* The same name is given to the *Sylvicōla petechia* of America, also called the *red-headed warbler* and *yellow red-pole.*

Red River, a large river of the U. States, the southernmost of the great tributaries of the Mississippi. It rises in Northern Texas, and has several sources, the chief, besides the main stream, being called the North and South Forks, which unite with it on the boundary of Texas and Oklahoma Territory. The stream then flows E.S.E., forming the boundary between Texas and the Indian Territory, and between Texas and Arkansas; cuts off a corner of the latter state, and then flowing through Louisiana falls into the Mississippi, 125 miles north-west of New Orleans; total course estimated at 1550 miles; chief affluents—the Washita, which joins it in Louisiana; and the False Washita, which it receives in the Indian Territory. Much of its course is through rich prairies. About 1200 miles of the river are useful for navigation, but its mouth at low water can be entered only by boats drawing 2 feet.

Red River, or SONG-KA, a large river of Tonquin, formed by the junction of the Leteën and Song-shai, the former rising in China, the latter in Laos. It flows S.E.,

passes Hanoi, and falls by several mouths into the Gulf of Tonquin.

Red River of the North, a river of North America, which rises in Elbow Lake, in Minnesota, flows south and south-west, and then nearly north, crossing from the United States into Manitoba, where it falls into Lake Winnipeg. Its entire length is 665 miles, 525 of which are in the U. States. In Manitoba it receives the Assiniboine, another large stream, at its junction with which stands the town of Winnipeg.

Red River Settlement, a settlement formed in 1812 by the Earl of Selkirk on the banks of the above river; repurchased by the Hudson's Bay Company in 1836; finally transferred to the Canadian govern- in 1870, and now made part of the province of Manitoba.

Red Root, a name given to several plants, one of them *Ceanŏthus americānus*, natural order Rhamnaceæ. It has simple alternate leaves and large red roots, and is found in North America, where the leaves are used sometimes to make an infusion of tea.

Red'ruth, a market town, England, county of Cornwall, 9½ miles north-west of Falmouth. The inhabitants are principally employed in the tin and copper mines of the neighbourhood. Pop. 10,324.

Red Sea, or ARABIAN GULF, a branch of the Indian Ocean, communicating with it by the Strait of Bab-el-Mandeb, stretching in a N.N.W. direction between Arabia on the east, Abyssinia, Nubia, and Egypt on the west, and connected with the Mediterranean on the north by the Suez Canal. It forms a long and narrow expanse, stretching for 1450 miles, with a breadth which averages about 180 miles, but diminishes gradually at its extremities. At the northern end it divides into two branches, one of which, forming the Gulf of Akaba, penetrates into Arabia for about 100 miles, with an average breadth of about 15 miles; while the other, forming the Gulf of Suez, penetrates between Arabia and Egypt for about 200 miles, with an average breadth of about 20 miles. The shores consist generally of a low, sandy tract, varying in width from 10 to 30 miles, and suddenly terminated by the abutments of a lofty table-land of 3000 feet to 6000 feet high. Occupying a long deep valley this water expanse has gradually been divided into three channels formed by coral reefs and islands. In the main channel the depth reaches in one place 1054 fathoms, but diminishes towards the extremities to 40 fathoms, while in the harbour of Suez it amounts to only 3 fathoms. From October to May, when the wind sets steadily from the south, a strong current flows in from the Strait of Bab-el-Mandeb; while from May to October, the north wind continues to blow, which gives the current a southern direction. The result of this is to raise the sea-level by several feet north and south alternately. The atmosphere is excessively hot in the warm season. The principal harbours of the Red Sea are, on the African coast, Suez, Kosseir, Suakin, and Massowa; and on the Arabian coast, Jedda (the port of Mecca), Hodeida, and Mocha. The cross trade consists chiefly of slaves from Africa and pilgrims to Mecca, but the through traffic has been immensely increased by the Suez Canal. The Israelites are supposed to have crossed the Red Sea at its northern extremity in the Gulf of Suez, and near the town of that name, but opinions vary as to the precise spot.

Redshank, a bird of the genus *Totănus*, the *T. calidris*, so called from its red legs. It is about 11 inches long, resides in Britain all the year, but is known also as a summer bird of passage in the most northern parts of Europe and Asia, occurring in winter as far south as India. The spotted redshank (*T. fuscus*) visits Britain in spring and autumn on its migrations north and south.

Red-snow. See *Protococcus*.

Redstart, a bird (*Ruticilla phœnicūra*) belonging to the family Sylviadæ, nearly allied to the redbreast, but having a more

Redstart (*Ruticilla phœnicūra*).

slender form and a more slender bill. It is found in almost all parts of Britain as a summer bird of passage, and has a soft sweet song. The tail is red, whence the name, *start* being A.-Saxon *steort*, a tail. The forehead is white, the throat black, the upper parts lead-gray or brown. The black

redstart (*Phœnicura tithys*) is distinguished from the common redstart by being sooty black on the breast and belly where the other is reddish brown, and is only an occasional visitor to Great Britain. The American redstart is a small bird of the family Musicapidæ or fly-catchers, common in most parts of North America.

Red-top, a well-known species of bent-grass, the *Agrostis vulgāris*, highly valued in United States for pasturage and hay for cattle. Called also *English Grass* and *Herd's-grass*.

Reductio ad absurdum, a species of argument much used in geometry, which proves not the thing asserted, but the absurdity of everything which contradicts it. In this way the proposition is not proved in a direct manner by principles before laid down, but it is shown that the contrary is absurd or impossible.

Reduction, in arithmetic, the bringing of numbers of one denomination into another, as farthings to shillings, or shillings to farthings; pounds, ounces, pennyweights, and grains to grains, or grains to pounds.

Reduction, in Scots law, an action for setting aside a deed, writing, &c. The object of this class of actions is to reduce and set aside deeds, services, decrees, and rights, whether heritable or movable, against which the pursuer of the action can allege and instruct sufficient legal grounds of reduction.

Red-water, a disease of cattle, and occasionally of sheep, in which the appetite and rumination become irregular, the bowels speedily become constipated, and the urine reddened with broken-down red globules of blood. It is caused by eating coarse, indigestible, innutritive food, by continued exposure to inclement weather, and other causes which lead to a deteriorated state of the blood. Called also *Bloody Urine*, *Hæmaturia*, and *Moor-ill*.

Redwing, a species of thrush (*Turdus iliăcus*), well known in Britain as a winter bird of passage. It spends the summer in the northern parts of Europe and Asia, its winter range extending to the Mediterranean. It is about equal to the song thrush in size, congregates in large flocks, and has an exquisite song.

Redwing, a town of the United States, in Minnesota, 40 miles south-east of St. Paul. Pop. 6294.

Red-wood, the name of various sorts of wood of a red colour, as an Indian dyewood, the produce of *Pterocarpus santalinus;* the wood of *Gordonia Hæmatoxylon*, the red-wood of Jamaica; that of *Pterocarpus dalbergioides*, or Andaman wood; that of *Ceanōthus colubrīnus*, the red-wood of the Bahamas; that of *Sequoia sempervirens*, a coniferous tree of California, the red-wood of the timber trade; that of *Soymida febrifuga*, of which the bark is used in India for fevers, and has been employed successfully in Europe for typhus. The Californian red-wood is the best known. The tree reaches a very great size, and forms forests in the coast mountains of California. It can stand the climate of Britain.

Ree, LOUGH, a lake of Ireland, formed by the Shannon, between the counties of Longford, Westmeath, and Roscommon, 17 miles long and 1 mile to 6 miles broad, studded with islands.

Reebok (rē'bok; that is roebuck), a species of South African antelope, the *Antilŏpe capreŏlus*. The horns are smooth, long, straight, and slender. The reebok is 2½ feet high at the shoulder, of a slighter and more graceful form than the generality of other antelopes, and extremely swift.

Reed, a name usually applied indiscriminately to all tall, broad-leaved grasses which grow along the banks of streams, pools, and lakes, and even to other plants with similar leaves, growing in such situations, as the bamboo. Strictly speaking, however, it is the name given to plants of the genera *Arundo*, *Psamma*, and *Phragmītes*, and especially to *Phragmītes commūnis* (the common reed). This, the largest of all the grasses of northern climates, is used for roofing cottages, &c. It is exceeded in size by the *Arundo donax* of Southern Europe, which sometimes grows to the height of 12 feet. The sea-reed or mat-grass (*Ammophila* (or *Psamma*) *arenaria*) is often an important agent in binding together the masses of loose sand on sea-shores. The bur-reed of Britain is of the genus *Sparganium* of the reed-mace order. See *Reed-mace*.

Reed, in music, a vibrating slip or tongue in the mouth-piece through which a hautboy, bassoon, or clarinet is blown, originally made of reed; or one of the thin plates of metal whose vibrations produce the notes of an accordion, concertina, or harmonium, or a similar contrivance in an organ-pipe.

Reed, SIR EDWARD JAMES, K.C.B., naval architect, born 1830. He was at one time connected with Sheerness dockyard, and having become an authority on naval architecture he was appointed chief constructor

to the navy, for which he designed a number of iron-clads and other vessels. He resigned this post in 1870, but has held other government appointments, has represented in parliament the Pembroke boroughs and Cardiff, and was a junior lord of the treasury under Mr. Gladstone in 1886. He has published works on shipbuilding and coast defence; and Japan, its History, Traditions, and Religions (1880).

Reed-bird. See *Rice-bunting*.

Reed-mace, a plant of the genus *Typha*, natural order Typhaceæ. Two species are British, *T. latifolia*, or greater reed-mace, and *T. angustifolia*, the lesser. These plants are also known by the name of *cat-tail*, and grow in ditches and marshy places, and in the borders of ponds, lakes, and rivers. They are tall, stout, erect plants, sometimes 6 or 8 feet high, with creeping root-stocks, long flag-like leaves, and long dense cylindrical brown spikes of minute flowers. They are sometimes erroneously called bulrush.

Reef, a certain portion of a sail between the top or bottom and a row of eyelet-holes running across the sail, one or more reefs

Wherry with fore-sail reefed, the main-sail showing reef-bands and reef-points.

being folded or rolled up to contract the sail in proportion to the increase of the wind. There are sets of cords called *reef-points* attached to the sail for tying up the reefs, and the sail is also strengthened by *reef-bands* across it. There are several reefs parallel to each other in the superior sails, and there are always three or four reefs parallel to the foot or bottom of the chief sails which are extended upon booms. Many ships are now fitted with sails which can, by a mechanical appliance, be reefed from the deck.

Reef, a chain, mass, or range of rocks in various parts of the ocean, lying at or near the surface of the water.

Reel, a machine on which yarn is wound to form it into hanks, skeins, &c. Also a skeleton barrel attached to the butt of a fishing-rod, around which the inner end of the line is wound, and from which it is paid out as the fish runs away when first hooked.

Reel, a lively dance peculiar to Scotland, in one part of which the couples usually swing or whirl round, and in the other pass and repass each other, forming the figure 8. The music for this dance, called by the same name, is generally written in common time of four crotchets in a bar, but sometimes in jig time of six quavers.

Reem, the Hebrew name of an animal mentioned in Job xxxix. 9, and translated as unicorn. There is little doubt that a two-horned animal was intended by the name, and the common belief now is that the reem was the aurochs or urus.

Re-entry, in law, the resuming or retaking the possession of lands lately lost. A *proviso for re-entry* is a clause usually inserted in leases, that upon non-payment of rent, &c., the term shall cease.

Rees, Abraham, born in Wales 1743, died 1825. He was educated at Hoxton Academy, where he remained as tutor for over twenty years; became pastor of a Presbyterian church in Southwark, and afterwards in the Old Jewry; edited E. Chambers's Cyclopedia (1776–86); and subsequently a larger work called Rees' Cyclopedia (1802–19, 45 vols.).

Reeve, the name given to the female of the bird called the ruff. See *Ruff*.

Reeve, the title of the official existing in early times in England, who was appointed by the king to carry into execution the judgments of the courts presided over by the ealdorman (earl) and other high dignitaries, to levy distresses, exact the imposts, contributions, tithes, and take charge of prisoners.

Reeves, John Sims, tenor singer, born at Shooters' Hill, Kent, in 1822; studied singing under Hobbs and T. Cooke; appeared as a baritone on the stage at Newcastle in 1839; joined a company at Drury Lane under Macready as second tenor in 1841; visited the Continent and studied under Bordogni at Paris, and Mazzucato at Milan; and in 1847 returned to England, where he met with great success. He devoted himself more especially to oratorio and ballad singing, and long held the reputation of being

the first of modern tenors. He published an autobiography in 1889.

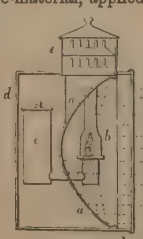
Reference, in law, the process of assigning a cause depending in court, or some particular point in a cause for a hearing and decision, to persons appointed by the court.

Referen'dum is a term used in the Swiss Confederation to denote the reference to the citizen voters of resolutions or laws passed by their representatives. If these, when so referred, are accepted by the majority of the voters of the canton, then they become part of the law of the land; but if they are rejected, then the rejection is final. The referendum is obligatory when the law or resolution affects the constitution; in other cases it is optional, and may be demanded on the requisition of a certain number of voters.

Refining of Metals, the processes by which the various metals are extracted from their ores, and obtained in a state of purity. See the articles on the several metals.

Reflection, specifically, in physics, the change of direction which a ray of light, radiant heat, sound, or other form of radiant energy, experiences when it strikes upon a surface and is thrown back into the same medium from which it approached. When a perfectly elastic body strikes a hard and fixed plane obliquely it rebounds from it, making the angle of reflection equal to the angle of incidence. This is also the case with light, but the light undergoes the change known as polarization. See *Polarization, Optics.*

Reflector, a polished surface of metal, or any other suitable material, applied for the purpose of reflecting rays of light, heat, or sound in any required direction. Reflectors may be either plane or curvilinear; of the former the common mirror is a familiar example. Curvilinear reflectors admit of a great variety of forms, according to the purposes for which they are employed; they may be either convex or concave, spherical, elliptical, parabolic, or hyperbolic, &c. The parabolic form is perhaps the most generally serviceable, being used for many purposes of illumination, as well as for various highly important philosophical instruments. The annexed cut is a section of a ship lantern fitted with an argand lamp and parabolic reflector. *a a* is the reflector, *b* the lamp, situated in the focus of the polished concave paraboloid, *c* the oil cistern, *d* the outer frame of the lantern, and *e* the chimney for the escape of the products of combustion. See *Optics, Lighthouse.*



Parabolic Reflector.

Reflexive Verb, in grammar, a verb which has for its direct object a pronoun which stands for the agent or subject of the verb, as I *bethought myself;* the witness *forswore himself.* Pronouns of this class are called *reflexive pronouns*, and in English are generally compounds with *self;* as, to deny *one's self;* though such examples also occur as: he bethought *him* how he should act, 'I do repent *me.*'

Reflex Nervous Action, in physiology, those actions of the nervous system whereby an impression is transmitted along sensory nerves to a nerve centre, from which again it is reflected to a motor nerve, and so calls into play some muscle whereby movements are produced. These actions are performed involuntarily, and often unconsciously, as the contraction of the pupil of the eye when exposed to strong light. See *Nerve.*

Reform, PARLIAMENTARY. See *Britain, History.*

Reformation, the term generally applied to the religious revolution in the 16th century which divided the Western Church into the two sections known as the Roman Catholic and the Protestant. Before this era the pope exercised absolute authority over the whole Christian Church with the exception of those countries in which the Greek or Eastern Church had been established. He also claimed supremacy in temporal affairs wherever his spiritual authority was recognized. Various abuses had in process of time sprung up in the Church, and attention had often been called to these both by laymen and clerics. An important movement in the direction of a reformation was begun by Wickliffe (1324–84) in England, a movement which, on the Continent, was developed by Huss (1369–1415) and Jerome of Prague (1360–1416) with their Bohemian followers; but the times were not ripe for combined opposition. New and powerful influences, however, were now at work. The Renaissance increased the number of

scholars; the new art of printing diffused knowledge; while the universities gave greater attention to the Greek and Hebrew languages, and grew in numbers. Much of the intellectual force and fearlessness brought forth by the Renaissance was turned against the corrupt practices in the church. In the writings of Erasmus (1467–1536), as well as in a host of satires, epigrams, &c., the ecclesiastics of the time were held up to a derision which thoughtful men recognized as just. The condition of the Western Church, indeed, was such that a reformation of some kind was now inevitable. The great movement known as the Reformation was started by Martin Luther, an Augustine monk of Erfurt, professor of theology in the University of Wittenberg; and what immediately occasioned it was the sale of indulgences in Germany by a duly accredited agent, Johann Tetzel, a Dominican monk of Leipzig. Luther condemned this abuse, first in a sermon and afterwards in ninety-five theses or questions which he affixed to the door of the great church, October 31st, 1517. This at once roused public interest and gained him a number of adherents, among them men of influence in church and state. Luther urged his spiritual superiors and the pope to put a stop to the traffic of Tetzel and to reform the corruptions of the church in general. A heated controversy now arose, Luther was fiercely assailed, and in 1520 excommunication was pronounced against him by Pope Leo X. (See *Luther.*) Upon this the reformer appealed to a general council; and when his works were burned at Mainz, Cologne, and Louvain, he publicly committed the bull of excommunication with the papal canons and decrees to the flames (December, 1520). From this time Luther formally separated from the Roman Church, and many of the principal German nobles —Hutten, Sickingen, Schaumburg, &c., the most eminent scholars, and the University of Wittenberg, publicly declared in favour of the reformed doctrines and discipline. Luther's bold refusal to recant at the Diet of Worms (April 17th, 1521) gave him increased power, while the edict of Worms and the ban of the emperor made his cause a political matter. By his ten months' seclusion in the Wartburg, after the Diet of Worms, Luther was secured from the first consequences of the ban of the empire, and the emperor was so much engaged by French and Spanish affairs that he almost wholly lost sight of the religious ferment in Germany. Leo's successor, Adrian VI., now considered it necessary to interfere, but in answer to his demand for the extirpation of the doctrines of Luther he received a list of a hundred complaints against the papal chair from the German states assembled at the Diet of Nürnberg (1522). While Luther was publishing his translation of the New Testament, which was soon followed by the translation of the Old; and while Melanchthon was engaged on his Loci Communes (the first exposition of the Lutheran doctrines) serious preparations for the reform of ecclesiastical abuses were made in Pomerania, Silesia, in the Saxon cities, in Suabia, &c., and the Reformation made rapid progress in Germany. Luther's Liturgy had no sooner appeared (1522), than it was adopted in Magdeburg and elsewhere. Translations of the Bible into Dutch and French now appeared, and at Meux in France a Lutheran church was organized. In vain did the Sorbonne condemn the principles of Luther, and powers political and ecclesiastical endeavour to stop this movement. In 1525 John, the successor of Luther's first patron Frederick in the Saxon electorate, Philip, landgrave of Hesse, and Albert of Brandenburg, duke of Prussia, publicly declared themselves Lutherans. Aided in great measure by the state of political affairs, the movement continued to spread rapidly. In these circumstances the emperor convened the Diet of Augsburg (June 1530), at which Melanchthon read a statement of the reformed doctrine, now known as the Confession of Augsburg. The Catholic prelates replied to this by requiring the reformers to return to the ancient church within a certain period. The princes who favoured the new movement refused to comply with this demand, and in March of the following year they assembled at Schmalkald and formed the famous league, in terms of which they pledged themselves to uphold the Protestant cause. This decisive step soon attracted powerful support, largely because of its political importance, and among others who joined the Schmalkald League were Francis I. of France and Henry VIII. of England. After the death of Luther (1546) war broke out, but at the Peace of Augsburg (1555) the Reformation may be said to have finally triumphed when each prince was permitted to adopt either the Reformed or the R. Catholic faith, and Protestantism thus received legal recognition.

The doctrines of the German reformer found a willing adherent in Gustavus Vasa,

who in 1523 became King of Sweden. Gustavus induced the estates of the realm, in the Diet of Westerås (1527), to sanction the confiscation of the monasteries, and declared himself supreme in matters ecclesiastical. The last remains of Catholic usages were abolished at a second Diet of Westerås in 1544. The first systematic measures in favour of the Reformation in Denmark were taken by Frederick I., instigated by his son Christian, who had studied in Germany and become an enthusiastic Lutheran. At a diet held in 1536, at which no member of the clergy was allowed to be present, the assembly decreed the abolition of the R. Catholic worship in the Danish dominions. In Hungary, where numerous Germans had settled, bringing Lutheranism with them, the new faith for a short time made rapid progress, especially in the cities and among the nobles. In Poland the Reformation found numerous adherents also. Both in Italy and Spain Protestantism was mostly confined to the higher and cultivated classes, the Reformed faith taking scarcely any hold on the people at large. In Naples, Venice, Florence, and other cities Protestant churches were opened; but Protestantism was extirpated in Italy by the vigorous action of the Inquisition and the instrumentality of the *Index Expurgatorius*. In Spain a few Protestant churches were established, and many persons of mark adopted the views of the Reformers. But here also the Inquisition succeeded in arresting the spread of the religious revolution. In the Swiss states the progress of Protestantism was of much more importance. It found a leader in Ulrich Zwingli, a preacher at Zürich, who, by sermons, pamphlets, and public discussions, induced that city to abolish the old and inaugurate a new Reformed Church. In this course Zürich was followed by Bâle, Berne, and other cities. Ultimately this movement was merged in political dissensions between the Reformed and the R. Catholic cantons, and Zwingli himself fell in battle (1531). Between Luther and Zwingli there were differences of opinion, chiefly concerning the Lord's Supper, in which the former showed considerable acrimony towards his fellow-reformer. The Institutes of Calvin formulated the doctrines of a large body of the reformers, who also accepted his ordinances regarding church discipline. (See *Calvin*.) After many tedious contests Calvin's creed was virtually accepted in the Netherlands and elsewhere, and it was introduced into Scotland by Knox. In France the Reformation seemed at first to find powerful support. Margaret, Queen of Navarre, sister of King Francis I., and many of the higher ecclesiastics favoured the reformed doctrine. The New Testament was translated into French, churches to the number of 2000 were established by 1558, and the Huguenots, as the Protestants were called, formed a large religious party in the state. Unhappily, however, the religious element was mixed with political and personal hatreds, and in the civil strifes before and after the Massacre of St. Bartholomew (1572) the religious movement declined. The abjuration of Protestantism by Henry IV. (1593) was a blow to the Huguenots, and though they obtained toleration and certain privileges by the Edict of Nantes (which see) this was finally revoked in 1685.

The Reformation in England was only indirectly connected with the reform movement in Germany. Wickliffe and the Lollards, the revival of learning, the writings of More, Colet, and Erasmus, the martyrdom of Thomas Bilney, had all combined to render the doctrine and discipline of the church unpopular. This feeling was greatly increased when the writings of Luther and Tyndale's translation of the Bible found eager readers. Then the political element came in to favour the popular reform movement. Henry VIII., in his efforts to obtain a divorce from Catherine, found it necessary to repudiate the papal supremacy and declare himself by act of parliament (1534) the supreme head of the Church of England. To this the pope replied by threats of excommunication, which were not, however, immediately executed. Yet the breach with Rome was complete, so far, at least, as the king was concerned. Under the new laws of supremacy and treason several of the clergy suffered at Tyburn; Sir Thomas More and Fisher, bishop of Rochester, were beheaded at Tower Hill; and the lesser and greater monasteries were suppressed. At this time there were three chief parties in the state. There was the party who still held the pope to be the supreme head of the church; the king's party, who rejected papal authority but retained the R. Catholic faith; and there was the reformed party, who rejected both the authority and the doctrine of the Roman Church. The doctrines of the Church of Rome, however, were still the established religion, and in 1539 the Statute of the Six Articles compelled all men, under penalty of burning, to admit six points of the Roman

doctrine, of which the chief was the doctrine of transubstantiation. Yet the king (1544) allowed some progress to be made in the direction of reform by the publication of the Litany and some forms of prayer in English. This movement was continued and the Reformation effected in all essential points during the reign of Henry's successor, Edward VI. The penal laws against the Lollards were abolished; the Statute of the Six Articles ceased to be enforced; the Protestant ritual and teaching was adopted by the church; all images were removed from churches; a new communion service took the place of the mass; a First Book of Common Prayer was compiled by Cranmer and purged of distinctive Roman doctrine; and in 1549 the First Act of Uniformity enjoined the use of this book in all the churches. Still further, in 1551 the newly established faith of the Reformers was summed up in the Forty-two Articles of Religion, which, in the reign of Elizabeth, became the Thirty-nine Articles of the Church of England. By these and other means the Reformation was established gradually throughout England.

In Scotland the movement was more directly connected with the Continent, and in particular with Geneva. The first indication of the struggle against the Roman doctrine is found in the martyrdom (1528) of Patrick Hamilton; and this policy of suppression was continued (1539–46) with great severity by Cardinal Beaton, until he himself became the victim of popular vengeance. Perhaps the most important result of this persecution, and the martyrdom of George Wishart, which Beaton had brought about, was that it determined John Knox to embrace the new reformed faith. In 1546–47 the Scottish reformer established himself as preacher to the Protestant congregation which held the castle of St. Andrews. When the castle was captured by the French fleet Knox was made prisoner and treated as a galley-slave, but regained his liberty after about eighteen months' hardship, and settled in England. During the Marian persecutions he withdrew to the Continent and visited the churches of France and Switzerland, but returned to Scotland in 1559. Here he at once joined the Protestant party; preached in Dundee, Perth, and St. Andrews, amid public tumult and the destruction of images, altars, and churches; and finally, under the protection of the Lords of the Congregation, he established himself as a preacher of Protestantism in St. Giles', Edinburgh. From this centre Knox travelled all over Scotland teaching the reformed faith; and such was the roused spirit of the people, that when the Scottish parliament assembled (1560) a popular petition was presented demanding the abolition of popery. This was promptly accomplished, and at the assembling of the new Church of Scotland shortly afterwards Knox presented his reformed system of government under the name of the First Book of Discipline, which was adopted by the Assembly. (See *Knox.*) The position thus secured by the reformer was maintained and the Reformation successfully established in Scotland. In Ireland for various causes the Reformation never made much progress.

Refor'matory Schools, schools instituted for the training of juvenile offenders (under sixteen) who have been convicted of an offence punishable by penal servitude or imprisonment. The offender, after undergoing a short imprisonment, is committed to a certified reformatory under an order from the court, and there detained for a period not less than two and not more than five years. These reformatories are usually managed by a committee of the local authority, who appoint the officers and direct the discipline subject to government inspection and approval. The acts relating to these institutions were consolidated and amended in 1866. The number of reformatory schools in Great Britain in 1895 was 50 (41 in England and 9 in Scotland); 43 were for Protestants and 7 for Roman Catholics. The number under detention was 4911 boys and 722 girls. Three of the reformatories are training-ships. See *Industrial Schools.*

Reformed Church, in general, comprehends those churches which were formed at the Reformation; but the term is specifically applied to those Protestant churches which did not embrace the doctrines and discipline of Luther. The title was first assumed by the French Protestants, but afterwards became the common denomination of all the Calvinistic churches on the European Continent. The Reformed Church of America is a body known up to 1867 as the Reformed Protestant Dutch Church, being founded by settlers from Holland and holding Calvinistic doctrines. As the original members spoke Dutch, this language was long used in public worship.

Reformed Presbyterians, or CAMERONIANS, a body of Christians who profess to

hold the principles of the Church of Scotland at the period of the second Reformation, between 1638 and 1650. They claim to be the legitimate successors of that section of the Covenanters which was headed by Cameron and Cargill, who considered that Charles II. had forfeited all title to their allegiance, having broken the solemn vows which he made at his coronation. When William of Orange was called to the throne in 1688 they were among the first to welcome him; but while they avowed their readiness to yield all loyal obedience and submission they openly declared their dissatisfaction with the Revolution settlement. In 1690 Presbyterianism was established in Scotland, but because the state claimed a certain control over the church this settlement was also repudiated by the Reformed Presbyterians. The position which the sect was thus compelled to occupy was that of dissenters from the church and protesters against the state. For upwards of sixteen years after they had publicly avowed their principles they remained in an unorganized condition and without a regular ministry. The first who exercised this office was the Rev. John M'Millan, who in 1706 demitted his charge as parish minister of Balmaghie, and in 1743 he met with a coadjutor in the Rev. Thomas Nairne, whereupon these two constituted a Reformed Presbytery in 1743. In 1810 three presbyteries were formed, and in 1811 a synod was constituted. The number of presbyteries was afterwards increased to six, and the number of ministers rose to about forty. In 1876 a large portion of them united with the Free Church of Scotland, the remnant consisting of about twelve congregations, which form two presbyteries —Glasgow and Edinburgh.

Refraction, the deflection or change of direction impressed upon rays of light obliquely incident upon and passing through a smooth surface bounding two media not homogeneous, as air and water,—or upon rays traversing a medium, the destiny of which is not uniform, as the atmosphere. (See *Optics*.) A familiar instance of refraction is the broken appearance which a stick presents when thrust partly into clear water, the portion in the water apparently taking a different direction from the other portion. Glass, water, and other solids and fluids each have a different power of refraction, and this power in each case may be expressed numerically by a number known as the *index of refraction*. *Atmospheric refraction* is the apparent angular elevation of the heavenly bodies above their true places, caused by the refraction of the rays of light in their passage through the earth's atmosphere, so that in consequence of this refraction the heavenly bodies appear higher than they really are. It is greatest when the body is on the horizon, and diminishes all the way to the zenith, where it is nothing. *Double refraction* is the separation of a ray of light into two separate parts, by passing through certain transparent mediums, as Iceland-spar, one part being called the ordinary ray, the other the extraordinary ray. All crystals except those whose three axes are equal exhibit double refraction.

Refractor, or REFRACTING TELESCOPE. See *Telescope*.

Refrigerant (rē-frij'-), a cooling medicine, which directly diminishes the force of the circulation, and reduces bodily heat without any diminution of nervous energy. The agents usually regarded as refrigerants are weak vegetable acids, or very greatly diluted mineral acids; effervescing drinks, saline purgatives, &c. Refrigerants in medicine and surgery are also applied externally in the form of freezing-mixtures prepared with salt and pounded ice for the purpose of lowering the temperature of any particular part of the body.

Refrigeration. See *Freezing*.

Refrigerator, a name applied to cooling apparatus of various kinds. One kind is an apparatus for cooling wort, beer, &c., consisting of a large shallow vat traversed by a continuous pipe through which a stream of cold water is passed. The wort, &c., runs in one direction and the water in another, so that the delivery end of the wort is exposed to the coolest part of the stream of water. Another kind of refrigerator is a chest or chamber holding a supply of ice to cool provisions and prevent them spoiling in warm weather; or a vessel surrounded by a freezing-mixture used in the manufacture of ice-cream, ices, &c.

Refuge, CITIES OF. See *Cities of Refuge*.

Refugee', a person who seeks safety in a foreign country to escape persecution for religious or political opinions. A large historical movement of this kind occurred when the Edict of Nantes was repealed in France (1685). Such were the oppressions then put upon the Protestants by the dominant R. Catholic party that 800,000 of the former, it is estimated, sought refuge in England, Denmark, Holland, Switzerland, and Germany.

Regal, a small portable organ played with the fingers of the right hand, the left being

Regal, from an old painting.

used in working the bellows. It was much used during the 16th and 17th centuries.

Rega'lia, the emblems or insignia of royalty. The regalia of England consist of the crown, sceptre with the cross, the verge or rod with the dove, the so-called staff of Edward the Confessor, several swords, the ampulla for the sacred oil, the spurs of chivalry, and several other articles. These are preserved in the jewel-room in the Tower of London. The regalia of Scotland consist of the crown, the sceptre, and the sword of state. They, with several other regal decorations, are exhibited within the crown-room in the castle of Edinburgh. The term is also improperly applied to the insignia, decorations, &c., of orders, secret societies, &c.

Regat'ta, originally a gondola race held annually with great pomp at Venice, and now applied to any important showy sailing or rowing race, in which a number of yachts or boats contend for prizes.

Regela'tion (rē-je-), refreezing, a name given to the phenomena presented by two pieces of melting ice when brought into contact at a temperature above the freezing-point. In such a case congelation and cohesion take place. Not only does this occur in air, but also in water at such a temperature as 100° Fahr. The phenomenon, first observed by Faraday, is of importance in the theory of glacier movement. See *Glaciers*.

Regeneration, in theology, is the equivalent used by the English translators of the Bible for the Greek word *palingenesia*, which occurs only twice in the New Testament, in Matt. xix. 28 and in Titus iii. 5. In the former passage the term is applied generally to the gospel dispensation as a process of renovation, in the latter it is used as descriptive of the process of individual salvation. An equivalent term is used in 1 Peter i. 3, where it is translated 'begotten us again;' and in one or two other passages regeneration, as a theological term, refers to the doctrine of a change effected upon men by divine grace, in order to fit them for being partakers of the divine favour, and for being admitted into the kingdom of heaven.

Regensburg (rā-genz-bu*r*h). See *Ratisbon*.

Regent, a person who governs a kingdom during the minority, absence, or disability of the king or queen. In most hereditary governments the maxim is, that this office belongs to the nearest relative of the sovereign capable of undertaking it; but this rule is subject to many limitations.—In the English universities the name is given to members who have certain peculiar duties of instruction or government.

Regent-bird, or KING HONEY-EATER (*Sericŭlus chrysocephălus*), a very beautiful bird of Australia, belonging to the family Meliphagidæ or honey-eaters. The colour of the plumage is golden yellow and deep

Regent-bird (*Sericŭlus chrysocephălus*).

velvety black. It was discovered during the regency of George IV., and was named in compliment to him.

Regent's Park, situated in the north-west of London, in the parishes of Marylebone and St. Pancras, comprises 470 acres. In the time of Elizabeth it was a royal hunting-ground. It received its present name when George IV. was regent, having been planned at that time. A considerable portion of the ground is occupied by the Zoological Gardens, which are situated on the north of the park, and the Royal Botanic Gardens, which occupy its inner circle.

Reggio (red'jō) **di Calabria** (anc. *Rhegium Julii*), a seaport of S. Italy, capital of a province of the same name, on the east coast of the Strait of Messina, a handsome and beautifully-situated town. The principal edifice is the cathedral, a spacious basilica. It is the seat of an archbishop, and has manufactures of silk, linen, pottery, perfume, &c. Pop. 23,853.—The province occupies the south-western extremity or toe of Italy, and is a rugged and mountainous region. The area is 1515 square miles; the pop. 398,086.

Reggio nell' Emilia (*Rhegium Lepidi*), a town of N. Italy, capital of the province of same name, 15 miles W.N.W. Modena. It is surrounded by walls and ramparts, has regular streets, is the see of a bishop, has an ancient cathedral with a lofty dome, and several other churches, a handsome town-house, museum, library, theatre; manufactures of linen and silk goods, and a trade in cattle and wine. Pop. 18,634.—The province of Reggio lies between those of Parma on the west and Modena on the east; area, 877 square miles; pop. 259,793.

Re'giam-majesta'tem, the title given to a collection of ancient laws, bearing to have been compiled by the order of David I. king of Scotland. It resembles so closely the English *Tractatus de Legibus*, supposed to have been written by Glanvil in the reign of Henry II., that no doubt one was copied from the other, with the incorporation of earlier local usages and ancient customs.

Regil'lus, anciently a small lake of Italy, in Latium, to the south-east of Rome (site uncertain), celebrated for a great battle between the Romans and Latins in B.C. 496.

Regiment, a body of regular soldiers forming an administrative division of an army, and consisting of one or more battalions of infantry or of several squadrons of cavalry, commanded by a colonel and other officers. A regiment is the largest permanent association of soldiers, and the third subdivision of an army corps, several regiments going to a brigade, and several brigades to a division. These combinations are temporary, while in the regiment the same officers serve continually, and in command of the same body of men. The strength of a regiment may vary greatly, as each may comprise any number of battalions. Formerly the infantry regiments of the British army were distinguished by numbers, there being over a hundred of them. Under the new military organization of Britain the country is divided into regimental districts, the fighting forces of each district, regulars, militia, and volunteers, being now linked together into a unit under a territorial or other name. Two of the old regiments now form the first and second battalion of each of these territorial regiments. The British artillery force is organized in an anomalous way, the whole body forming one regiment, divided into brigades.

Regimental Schools, schools maintained in each regiment for the education of soldiers and their children. Adult soldiers are admitted free; children pay a nominal fee.

Regi'na, capital of the territory Assiniboia in the Canadian North-west, a rising town on the Canadian Pacific Railway, well situated near the fertile wheat district of the Qu'appelle Valley. Pop. 2000.

Regiomonta'nus, German astronomer, whose real name was Johann Müller, was born at Königsberg (in Latin *Regiomontum*), in Franconia, in 1436; died 1475. He was educated at Leipzig; studied mathematics at Vienna; accompanied Cardinal Bessarion to Rome, where Beza gave him further instructions in Greek literature, which enabled him to complete a new abridgment in Latin of the Almagest of Ptolemy (Venice, 1496). In 1471 he built an observatory at Nürnberg, but he returned to Rome on the invitation of Sixtus IV., who employed him in the reformation of the calendar.

Registrar-general, in Britain, an officer appointed by the crown, under the great seal, to whom the general superintendence of the whole system of registration of births, deaths, and marriages is intrusted.

Registration of Births, Deaths, and Marriages. Parish registers of baptisms, marriages, and burials were instituted by Lord Cromwell while he was vicar-general to Henry VIII., and subsequently regulated by various acts of parliament. No thorough system, however, existed until in 1836 a Registration Act was passed applicable to England and Wales, which has been amended by subsequent acts. When a birth takes place it is the duty of the father and mother, or the occupier of the house in which the child is born, to give information to the registrar within forty-two days of the birth. In registering a birth the day on which the child was born must be given, the name (if any), the sex, the name of father and mother, and the signature, description, and residence of the informant. Violation of the law regarding the registra-

tion of births renders the party liable to a penalty of not more than £10. With regard to the registration of marriages, when they are solemnized in any Established church the officiating clergyman is required to fill up a register of prescribed form. The particulars given are the date of the marriage, the name and surname of each of the parties, whether minors or not, whether married previously or not, rank, profession, or calling, residence at the time of marriage, name, surname, and rank or profession of the father of each of the parties. Deaths are registered much in the same way as births and marriages, the name, sex, age, profession, cause of death, &c., being stated according to a prescribed form. Within five days of the death the necessary particulars must be furnished to the registrar by the nearest relative of the deceased or other person present at the death. Non-compliance with the act entails a penalty not exceeding £10. The Irish system of registration of births, deaths, and marriages is similar to that of England and Wales. The Scotch system was introduced by the act of 1854, which provides for the appointment of a registrar-general, an office held by the deputy clerk register, and the establishment of a uniform system of registering births, deaths, and marriages. The giving of information is made obligatory, penalties being imposed for neglecting or refusing to give information, or for giving false information. In rural parishes registrars are appointed by the parochial board, in burghs by the town-council. Similar systems of registration exist in other countries. The registration of births, deaths, and marriages in the United States is subject to state legislation, not that of congress.

Registration of Deeds, a system very necessary and advantageous to a community, but only completely carried out in some countries. In England some measures have been taken to introduce such a system, but as yet it is very imperfect. In Scotland, on the other hand, deeds are carefully registered, the public registers being kept in the General Register House in Edinburgh, comprising all sasines, entails, adjudications, inventories affecting property, &c., which are open to the public for consultation on payment of fees. The general register office has absorbed all the local registers, except those of burghs, which are kept on the same plan. In some of the colonies and in the U. States the system is also very complete.

Registration of Electors (Parliamentary) was first established by the Reform Act of 1832, in terms of which, in England, the overseers of each parish were required to draw up a register of all persons qualified to vote. This still forms the basis of procedure, but the law has been frequently altered, notably in the Registration of the People Act (1884) and the Registration Act (1885). Under instructions from the clerk of the peace the overseers of the parish are now required to publish yearly on the 20th June a list of the qualified voters, and those persons not on the list must apply to have their names inserted before the 20th July. Any person on the register may object to any person on this list, but he must give notice to this effect. Copies of the amended list are transmitted to the revising barrister, who makes a circuit, holds an open court, takes evidence on oath, hears claims and objections, and decides to omit or insert the names of the applicants. An appeal from his decision can be laid before the Queen's Bench Division of the High Court. The list of voters being thus settled, it is printed and handed to the returning officer. In Scotland the register of voters is drawn up by assessors, aided in burghs by the town-clerks, and the duties connected with revision are discharged by the sheriff of the county. In Ireland the clerks of poor-law unions have charge of the registers, revision is made before assistant-barristers at a special session, and the completed register is placed in the hands of the sheriff in a county, and the returning officer in boroughs.

Registration of Shipping. See *Ships* (*Registration of*).

Regium Donum, an annual grant of public money formerly given in aid of the income from other sources of the Presbyterian clergy in Ireland, commuted in 1869 for £701,372.

Regius Professors is the name given to those professors in the English universities whose chairs were founded by Henry VIII. In the Scotch universities, the same name is given to those professors whose professorships were founded by the crown.

Regnal Years, the years a sovereign has reigned, numbered successively, and used for chronological purposes, as in the enumeration of acts of parliament. The practice of dating a new reign from the day following the last of the late king's reign has generally been adopted since the reign of Richard II., but before this time a reign was generally

considered to begin with some act of sovereignty.

Regnault (rē-nō), HENRI VICTOR, French chemist and physicist, born 1810, died 1878. He was educated at the École Polytechnique, Paris; became professor at this institution in 1840, and professor of physics at the Collége de France the following year; chief engineer of mines in 1841; and director of the porcelain manufacture at Sèvres in 1854. He published Cours Elémentaire de Chimie, and Premiers Eléments de Chimie, both popular works.

Regular Clergy, the term applied in the Roman Catholic Church to priests who have taken the vows, and who are bound to follow the rules of some monastic order, as opposed to the secular clergy, that is parish priests, &c., not connected with any of the orders.

Reg'ulus, name originally applied by the alchemists to antimony. The term is now used in a generic sense for metals in different stages of purity, but which still retain to a greater or less extent the impurities they contained in the state of ore.

Reg'ulus, MARCUS ATTILIUS, a Roman general, who was made consul a second time in 256 B.C., and was engaged in a war with Carthage, in which he destroyed their fleet and landed his army in Africa. In the following year, however, he was defeated and taken prisoner by the Carthaginians. Sent to Rome on parole by his captors to negotiate peace, Regulus patriotically persuaded his countrymen to continue the war and returned to captivity, where he died under torture.

Reichenbach (rī'ħen-bâħ), a town of Prussia, province of Silesia, 30 miles south-west of Breslau, on the Peile. It has woollen and cotton manfactures. Pop. 14,058.

Reichenbach, a town of Saxony, in the circle and 7 miles south-east of Zwickau. It has manufactures of woollen and cotton goods; worsted and cotton mills; dye-works and bleachfields; machine works, foundries, &c., and a considerable trade. Pop. 24,411.

Reichenbach, CHARLES, BARON VON, a German scientist, born at Stuttgart in 1788, died 1869. He studied law and natural science at Tübingen; established extensive works in Moravia, at which machinery, castings (statues, &c.), wood vinegar, tar, &c., were produced; published a monograph on geology; and gave his attention to animal magnetism, in connection with which he believed he had discovered a new force called *od*, regarding which he published various works. He is credited with some chemical discoveries, in particular of paraffin and kreasote.

Reichenberg (rī'ħen-berħ), a town of Bohemia, on the Neisse, 56 miles N.N.E. of Prague. It is the centre of the woollen manufacture of Northern Bohemia, in connection with which industry there are a great number of establishments in the town and neighbourhood. Pop. 28,090.

Reichenhall (rī'ħen-hâl), a town of Bavaria, 65 miles south-east of Munich, situated in the midst of romantic scenery, on the Saal. It has one of the most important salt-works in the kingdom, the salt being obtained from brine springs. The brine is also used for bathing purposes. Pop. 3271.

Reichstag (rīħs'tâħ; German *reich*, a kingdom, and *tag*, a day, a diet), the imperial parliament of Germany, which assembles at Berlin. See *Bundesrath, Germany.*

Reid (rēd), CAPT. MAYNE, born in the north of Ireland in 1819, died 1883. His love of adventure took him to America, where he travelled extensively as hunter or trader; joined the U.S. army in 1845 and fought in the Mexican war. He afterwards returned to London, where he became well known as a writer of thrilling juvenile stories, many of them based on his American experiences, such as the Rifle Rangers, Scalp Hunters, the War Trail, the Headless Horseman, &c.

Reid, THOMAS, D.D., Scottish philosopher, born in 1710 at Strachan, Kincardineshire; died 1796. He was educated at Marischal College, Aberdeen, and in 1737 was presented to the living of New Machar in Aberdeenshire. His first philosophical work was an Essay on Quantity (1748), in which he replied to Hutcheson, who had maintained that mathematical terms can be applied to measure moral qualities. In 1752 the professors of King's College, Aberdeen, elected Reid professor of moral philosophy in that college; and in 1764 he published his well-known work, An Inquiry into the Human Mind on the Principles of Common Sense. The same year he succeeded Adam Smith as professor of moral philosophy in Glasgow University, a position which he occupied until 1781. His other writings are, Essays on the Intellectual Powers of Man and Essays on the Active Powers of the Human Mind. His philosophy was directed against the principles and inferences of Berkeley and Hume, to which he opposed the doctrine of Common Sense (which see). He

was the earliest expounder of what is known as the Scottish School of Philosophy, in which he was followed by Dugald Stewart and Sir Wm. Hamilton. His doctrines were adopted also by several eminent French philosophers.

Reigate (rī′gāt), a municipal borough of England, county of Surrey, beautifully situated 19 miles s.s.w. of London, a place of considerable antiquity. It has an ancient church, a free grammar-school, a literary institute, &c. It now gives name to a parl. division. Pop. 22,646.

Reikiavik, or REYKJAVIK (rīk-yâ-vik′), a seaport, and capital of the island of Iceland, on the south-west coast. It is the see of a bishop, the seat of government, has a cathedral, an observatory, a public library, some manufactures, and a considerable trade. Pop. 3800.

Reims. See *Rheims.*

Reindeer (rān′dēr), a species of deer found in the northern parts of Europe and Asia, the

Reindeer (*Cervus tarandus*).

Cervus tarandus or *Tarandus rangifer*. It has branched, recurved, round antlers, the summits of which are palmated; the antlers of the male are much larger than those of the female. These antlers, which are annually shed and renewed by both sexes, are remarkable for the size of the branch which comes off near the base, called the brow antler. The body is of a thick and square form, and the legs shorter in proportion than those of the red-deer. Their size varies much according to the climate, those in the higher arctic regions being the largest; about 4 feet 6 inches may be given as the average height of a full-grown specimen. The reindeer is keen of sight, swift of foot, being capable of maintaining a speed of 9 or 10 miles an hour for a long time, and can easily draw a weight of 200 lbs., besides the sledge to which they are usually attached when used as beasts of draught. Among the Laplanders the reindeer is a substitute for the horse, the cow, and the sheep, as he furnishes food, clothing, and the means of conveyance. The caribou of North America, if not absolutely identical with the reindeer, would seem to be at most a well-marked variety of it.

Reindeer Moss, a lichen (*Cenomyce rangiferina*) which constitutes almost the sole winter food for reindeer, &c., in high northern latitudes, where it sometimes attains the height of 1 foot. It is also found in the moors and mountains of Britain. Its taste is slightly pungent and acrid, and when boiled it forms a jelly possessing nutritive and tonic properties.

Reineke Fuchs (rī′nek-ė fụks). See *Renard.*

Reis (rā′is), a Turkish title for various persons of authority, as for instance the captain of a ship. Reis Effendi was formerly the title of the Turkish chancellor of the empire and minister of foreign affairs.

Reisner-work (rīs′nėr), a species of inlaid cabinet-work composed of woods of contrasted colours, named after Reisner, a German workman of the time of Louis XIV. See *Buhl-work.*

Relapsing Fever, a fever so called from the fact that during the period of convalescence a relapse of all the symptoms occurs, and this may be repeated more than once. It is usually regarded as an epidemic and contagious disease. See *Fever.*

Relative Rank IN THE ARMY AND NAVY. The following is a list of equivalent ranks of combatant officers in the two services of Britain:—

Army.	Navy.
Field-marshal.	Admiral of the Fleet.
General.	Admiral.
Lieutenant-general.	Vice-admiral.
Major-general.	Rear-admiral.
Brigadier-general.	Captain of the Fleet and Commodore.
Colonel.	Captain over 3 years' service.
Lieutenant-colonel.	Captain under 3 years' service.
Major. Do. (junior).	Commander.
	Lieutenant of 8 years' standing.
Captain.	Lieutenant under 8 years' standing.
Lieutenant.	Sub-lieutenant.

Release, in English law, signifies, in general, a person's giving up or discharging the

right or action he has or claims to have against another or his lands.

Relics, remains of saints and martyrs or objects connected with them, and especially memorials of the life and passion of our Lord, to which worship or a special veneration is sanctioned and practised both in the Roman Catholic and Greek Churches. The doctrine of the Roman Catholic Church in regard to relics was fixed by the Council of Trent, which decreed in 1563 that veneration should be paid to relics as instruments through which God bestows benefits on men; a doctrine which has been rejected by all Protestant churches. The veneration of relics is not peculiar to Christianity, but has found a place in nearly every form of religion. Buddhism is remarkable for the extent to which relic-worship has been carried in it. The origin of relic worship or veneration in the Christian church is generally associated with the reverence paid by the early Christians to the tombs of the martyrs and to objects associated with their memory. Roman Catholics believe that relics are sometimes made by God instruments of healing and other miracles, and that they are capable of bestowing spiritual graces. The Council of Trent required bishops to decide on their authenticity. In course of time great abuses grew up in regard to relics; and it is scarcely necessary to add that the articles venerated as relics multiplied beyond measure. Not only did those of which the supply was necessarily limited, as the wood of the true cross and the relics of apostles and early martyrs, become common and accessible to an astonishing degree, but the most puerile and even ridiculous objects were presented as fitting symbols for veneration from their association with some saint or martyr, and were credited with the most astounding miracles. Such abuses have been greatly modified since the Reformation.

Relief, in sculpture and architecture, is the projection of a figure above or beyond the surface upon which it is formed. According to the degree of projection a figure is described as in *high*, *middle*, or *low relief*. High relief (*alto-rilievo*) is that in which the figures project at least one-half of their apparent circumference from the surface upon which they are formed; low relief (*basso-rilievo*) consists of figures raised but not detached from a flat surface; while middle relief (*mezzo-rilievo*) lies between these two forms. See *Bas-relief*, *Alto-rilievo*.

Relieving-officer, the officer appointed by the board of guardians of an English poor-law union to superintend the relief of the poor in the parish or district. His office is to receive applications for relief, inquire into facts, and ascertain that the case is within the conditions required by law. He has to give immediate relief in urgent cases.

Religion, the feeling of reverence which men entertain towards a Supreme Being or to any order of beings conceived by them as demanding reverence from the possession of superhuman control over the destiny of man or the powers of nature; more especially the recognition of God as an object of worship, love, and obedience. Religion, as distinguished from *morality*, denotes the influences and motives to human duty which are found in the character and will of the deity, while morality is concerned with man's duty to his fellows. As distinguished from *theology*, religion is subjective, inasmuch as it relates to the feelings; while theology is objective, as it denotes the system of beliefs, ideas, or conceptions which man entertains respecting the God whom he worships. Religion in one sense of the word, according to Max Müller, is a mental faculty by means of which man is enabled to apprehend the Infinite under different names and under varying disguises, and this independent of, or even in spite of sense and reason; being also a faculty which distinguishes man from the brutes. Another, and a very common use of the term, applies it to a body of doctrines handed down by tradition, or in canonical books, and accompanied by a certain outward system of observances or acts of worship. In this sense we speak of the Jewish, the Christian, the Hindu, &c., religions. Religions in this sense are divided into two great classes, polytheistic and monotheistic; that is, those recognizing a plurality of deities and those that recognize but one. (See *Polytheism*, *Monotheism*.) A dualistic class may also be established, in which two chief deities are recognized, and a *henotheistic*, in which there are one chief and a number of minor deities. In some religions magic, fetishism, animal worship, belief in ghosts and demons, &c., play an important part. The most remarkable religious conquests in history are that of Judaism, which effected the establishment of a national religion, originally that of a single family, in a hostile territory by force of arms and expulsion or extinction of the previous inhabitants; that of Christianity, which, by the power of persuasion and in the midst of

persecution, overthrew the polytheism of the most enlightened nations of antiquity; that of Mohammedanism, which, partly by persuasion, but more by force, established itself on the site of the eastern empire of Christianity, and extended its sway over a population partly idolatrous and partly Christian; that of Buddhism, which, being expelled by persecution from India, where it had widely disseminated itself by conversion, spread itself also by moral suasion over the larger portion of Eastern Asia. All these religions, with the exception of Buddhism, which may perhaps be considered atheistic, are monotheistic systems.

Various estimates have been made of the diffusion of the various religious creeds over the world. These are necessarily very loose and often differ widely from each other. A recent estimate is the following:—

Roman Catholics,	229,000,000
Protestants,	153,000,000
Eastern Churches,	112,000,000
Mohammedans,	194,000,000
Buddhists,	400,000,000
Brahmanists,	208,000,000
Followers of Confucius,	80,000,000
Sinto Religion,	14,000,000
Jews,	7,000,000

Religion, Established, or State Religion, is the form of religion recognized by the government or constitution of a country as national, and to which accordingly certain privileges and commonly a public maintenance are assigned. In Protestant countries the established form of religion is commonly called the Established Church. See *Established Church*.

Religious Liberty, or Liberty of Conscience, is the recognition and assertion by the state of the right of every man, in the profession of opinion and in the outward forms and requirements of religion, to do or abstain from doing whatever his individual conscience or sense of right suggests. Religious liberty is opposed to the imposition by the state of any arbitrary restrictions upon forms of worship or the propagation of religious opinions, or to the enacting of any binding forms of worship or belief. The limit of religious liberty is necessarily the right of the state to maintain order, prevent excesses, and guard against encroachments upon private right. In the organization of civil and ecclesiastical government which prevailed from Constantine to the Reformation persecution was in general only limited by dissent, and universal submission to the dominant church became the condition of religious peace throughout Christendom, while religious liberty was unknown. The contest of opinion begun at the Reformation had the effect of establishing religious liberty, as far as it at present exists, but the principle itself was so far from being understood and accepted in its purity by either party that it hardly suggested itself even to the most enlightened reasoners of that age. In Great Britain even, civil liberty, jealously maintained, was not understood, by the dominant party at least, to import religious liberty. Active measures of intolerance were adopted against Dissenters in the reign of Queen Anne. Even in the reign of George III. conditions were attached to the toleration of Dissenting preachers; and civil enactments against Roman Catholics have been repealed only within the present reign. Religious liberty was introduced in Prussia by Frederick the Great, but contravened by his immediate successor. The state at present in Prussia, without, perhaps, actually dictating to private individuals, maintains a vigilant control over ecclesiastical organization, the education of the clergy, and all public matters connected with religion. Religious liberty has only been established in Austria under the present monarch. Italy first enjoyed the same advantage under Victor Emanuel II. The government of France, even since the revolution, has always been of a paternal character, but practically religious liberty exists in France. In Spain, in the days of its power the most bigoted state in Europe, restricted liberty of worship was allowed only in 1876. Religious persecution was actively conducted against the R. Catholics in Russia during the reign of the emperor Nicholas, and full religious liberty does not yet exist. Since the Crimean war religious liberty has been recognized in Turkey. Toleration has thus been slowly advancing in Europe since the Reformation, and its recent progress has been extensive; yet even in the most advanced countries the state of public opinion on this subject is still far from being satisfactory.

Religious Orders. See *Orders (Religious)*.

Religious Peace. See *Peace (Religious)*.

Religious Tract Society, a society founded in London in 1779 for the circulation of small religious books and tracts in foreign countries, as well as through the British dominions. The circulation of the society's publications, which teach Evangelical Calvinism, is effected by means of depôts, of grants to foreign societies and to

missionaries, of colportage, &c., and is widely extended. The business of the society is conducted by a committee chosen annually in London, and consists of lay and clerical members belonging both to the Establishment and to Nonconformist bodies. The funds of the society are divided into missionary and trade funds, the former being raised from subscriptions, donations, &c. It disseminates publications in considerably more than 100 languages and dialects. According to the report for 1895–96 there were in the catalogue of the society about 4000 separate tracts, handbills, books, &c., for adults, besides books and tracts for children; the circulation of the society's publications during the year was 59,551,300; the income from subscriptions, donations, &c., was £27,692; and the grants in money, paper, publications, &c., £32,562. The Leisure Hour and the Sunday at Home are published by the Religious Tract Society.

Rel'iquary, a box or casket in which relics are kept. See *Relic*.

Relocation, TACIT, in Scots law, is the tacit or implied renewal of a lease, legally inferred where neither the landlord nor the tenant has given notice of intention to end it at the expiration of the stipulated period. The same doctrine is applied to contract of service.

Remainder, in law, is a limited estate or tenure in lands, tenements, or rents, to be enjoyed after the expiration of another particular estate.

Rembang', a town of Java, in the province of same name, 60 miles W.N.W. of Samarang. Its harbour is one of the best in the island; it has a good trade in ship-timber and in ship-building, and near it are valuable salt-pans. Pop. 11,000.

Rem'brandt, in full, REMBRANDT HERMAŃSZ VAN RYN, the most celebrated painter and etcher of the Dutch school, was born in 1606 at Leyden, where his father was a well-to-do miller. Early displaying a passionate love for art, he received instructions from Van Swanenburch of Leyden, a painter of little note, and afterwards studied in Amsterdam under Pieter Lastman. But he soon returned home, and pursued his labours there, taking nature as his sole guide, and confining himself to delineations of common life. In 1630 he removed to Amsterdam, which he never left again. In 1634 he married Saskia van Uilenburg, daughter of the burgomaster of Leeuwarden. Rembrandt has rendered her famous through numerous etched and painted portraits. She died in 1642. Rembrandt became the master of numerous pupils, Gerard Douw being among the number. His paintings and etchings were soon in extraordinary demand, and he must have acquired a large income by his work, but his expenditure seems to have been

Rembrandt Van Ryn.

greater; and in 1656 he was declared bankrupt, his property remaining in the hands of trustees till his death. This took place at Amsterdam in 1669. He had married a second time, but the second wife's name is not known. Rembrandt excelled in every branch of painting, and his treatment of light and shade has never been surpassed. His works display profound knowledge of human nature, pathos, tragic power, humour, and poetic feeling. His eminence in portraiture may especially be noted, in portrait-groups in particular. His artistic development may be broadly divided into three periods. To the first of these (1627–39), which shows less mastery than the succeeding two, belong his St. Paul, Samson in Prison, Simeon in the Temple, Lesson in Anatomy (Tulp the anatomist), and various character portraits of his wife as Queen Artemisia, Bathsheba, the Wife of Samson, &c. To his middle period (1640–54) belong The Night Watch, The Woman taken in Adultery, Tobit and his Wife, The Burgomaster and his Wife, Descent from the Cross, Portrait of Coppenol, Bathsheba, and Woman Bathing. Among the works of his last period (1655–68) may be mentioned John the Baptist Preaching, Portrait of Jan Six, The Adoration of the Magi, the Syndics of Amsterdam, and various portraits of himself. His etchings in technique and deep

suggestion have not yet been equalled. He was the first and as yet the greatest master of this department of art. Some of them have been sold at extraordinary prices—Jesus Healing the Sick, known as the Hundred-guelder Piece (1st state), having been sold at the Buccleuch sale in 1887 for 1300 guineas; and two others, a Coppenol and Jesus Before Pilate, bringing 1190 and 1150 guineas respectively. Of his works there are about 280 paintings and 320 etchings extant and accessible, dating from 1625 to 1668.

Remem'brancer, an officer in the exchequer of England whose duty is to record certain papers, make out processes, &c. The name is also given to an officer of some corporations, such as the city of London.

Remig'ius, the name of three eminent French ecclesiastics, the most famous of whom (St. Remigius or St. Remy) was bishop of Rheims for over seventy years, and in 496 baptized Clovis, king of the Franks, and founder of the French monarchy.

Remiremont (rē-mēr-mon), a town of France, department of the Vosges, picturesquely situated at the foot of the Vosges, on the left bank of the Moselle. It is famous for its ancient abbey, and has manufactures of muslin, lace, &c., with a considerable trade, principally in cheese. Pop. 7307.

Remittent Fever, a fever which suffers a decided remission of its violence during the course of the twenty-four hours, but without entirely leaving the patient. It differs from an intermittent fever in this, that there is never a total absence of fever. Remittent fever is severe or otherwise according to the nature of the climate in which the poison is generated. The autumnal remittents of temperate climates are comparatively mild, while the same fever in the tropics is often of a very severe type, and not unfrequently proves fatal. The period of remission varies from six to twelve hours, at the end of which time the feverish excitement increases, the exacerbation being often preceded by a feeling of chilliness. The abatement of the fever usually occurs in the morning; the principal exacerbation generally takes place towards evening. The duration of the disease is generally about fourteen days, and it ends in a free perspiration, or may lapse into a low fever. This fever is often cured by the administration of quinine, which should be given at the commencement of the remission. A simple yet nourishing diet must also be attended to. No stimulants must be allowed.

Remo, SAN. See *San Remo*.

Remon'strants. See *Arminians*.

Rem'ora, a genus of fishes included in the Goby family, and of which the common remora (*Echenēis remŏra*), or sucking-fish, is the typical example. These fishes have on the top of the head a peculiar sucking-disc, composed of a series of cartilaginous

Remora (*Echenēis remŏra*)

plates arranged transversely, by means of which they attach themselves to other fishes or to the bottoms of vessels. The common remora attains an average length of 1 foot and possesses a general resemblance in form to the herring. It is common in the Mediterranean Sea and in the Atlantic Ocean; and also occurs round the British coasts. Other species are of larger size. The ancients attributed to the remora the power of arresting and detaining ships in full sail.

Remscheid (rem'shīt), a town of Rhenish Prussia, 18 miles E.S.E. Düsseldorf, mostly on a rugged height. It is the chief seat of the German hardware industry. Pop. 47,285.

Remus. See *Romulus*.

Rémusat (rā-mü-zä), CHARLES FRANÇOIS MARIE, COMTE DE, politician and man of letters, was born at Paris 1797, died 1875. He was educated at the Lycée Napoléon, and entered life as a journalist and lawyer. He was a member of the Chamber of Deputies from 1830 to 1848, was minister of the interior for a few months in 1840, and minister of foreign affairs in 1871–73, in both cases in the cabinet of M. Thiers. During the second empire he lived in retirement, devoting himself chiefly to literary pursuits. His works include several on English subjects, such as L'Angleterre au XVIII. Siècle (1856), Bacon (1857), Lord Herbert of Cherbury (1874), Histoire de la Philosophie en Angleterre depuis Bacon jusqu'à Locke (1875).—His mother, CLAIRE ELIZABETH DE VERGENNES, COMTESSE DE RÉMUSAT (born 1780, died 1824), was a very remarkable woman. Her essay on Female Education, published after her death, received an academic *couronne*, and her Mémoires, published

in 1879–80, are particularly valuable for the light which they throw on the court of the first empire.

Rémusat (rā-mü-zä), JEAN PIERRE ABEL, French orientalist, born in 1788. He studied medicine, but devoted himself principally to the study of Eastern languages, especially Chinese. In 1811 appeared his Essai sur la Langue et la Littérature Chinoises, which attracted the attention of the learned. In 1814 he was appointed professor of Chinese and Manchu at the Collége de France, a chair established specially for him. He died in 1832.

Renais'sance, a term applied, in its more specific sense, to a particular movement in architecture and its kindred arts, but in a general sense to that last stage of the middle ages when the European races began to emerge from the bonds of ecclesiastical and feudal institutions, to form distinct nationalities and languages; and when mediæval ideas became largely influenced by the ancient classic arts and literature. It was a gradual transition from the middle ages to the modern, characterized by a revolution in the world of art and literature brought about by a revival and application of antique classic learning. The period was also marked by a spirit of exploration of lands beyond the sea, by the extinction of the scholastic philosophy, by the new ideas on astronomy promulgated by Copernicus, and by the invention of printing and gunpowder, &c.

Renaissance Architecture, a style which originated in Italy in the first half of the 15th century, and afterwards spread over Europe. Its main characteristic is a return to the classical forms and modes of ornamentation which had been displaced by the Byzantine, the Romanesque, and the Gothic. The Florentine Brunelleschi (died 1446) may be said to have originated the style, having previously prepared himself by a careful study of the remains of the monuments of ancient Rome. His buildings are distinguished by the use of the three classical orders, with much of the classical severity and grandeur, but in design they are made conformable to the wants of his own age. He sometimes retains, however, elements derived from the style which he superseded; as for instance in his masterpiece, the cathedral of Florence, where he makes a skilful use of the pointed Gothic vault. From Florence the style was introduced into Rome, where the noble and simple works of Bramante (died 1514) are among the finest examples of it, the chief of these being the palace of the Chancellery, the foundations of St. Peter's, part of the Vatican, the small church of San Petro in Montorio. It reached its highest pitch of grandeur in the dome of St. Peter's, the work of Michael Angelo (died 1564), after whom it declined. Another Renaissance school arose in Venice, where the majority of the buildings of the 16th and 17th centuries are distinguished by the prominence given to external decoration by means of pillars and pilasters. From this school sprung Palladio (1518–80), after whom the distinctive style of architecture which he followed received the name of Palladian. The Renaissance architecture was introduced into France by Lombardic and Florentine architects about the end of the 16th century, and flourished there during the greater part of the following century, but especially in the first half under Louis XII. and Francis I. The early French architects of this period, while adopting the ancient classical orders and other features of the new style, still retained many of the features of the architecture of the preceding ages; later on they followed classical types more closely, as in the palace of the Louvre. As applied to ecclesiastical edifices, the Renaissance style of architecture is charged in France as elsewhere with depriving them of religious character. Towards the end of the 16th century the Renaissance style degenerated in France as it had done in Italy, and after passing through the degenerate phase known as the Baroque style, it gave rise to the insipid and over-decorated productions of the so-called Rococo style. Into England the Renaissance style was introduced during the time of Elizabeth, and it is there represented by the works of Inigo Jones (1572–1652), Sir C. Wren (1632–1723), and their contemporaries, St. Paul's, London, being a grand example of the latter architect. A great many of the princely residences of Germany belong to the Renaissance style, but not to its best period. Renaissance architecture presents many phases and varieties of style. It has been much used in modern work. The prevailing style employed in the rebuilding of Paris is Renaissance.

Renaix (rē-nā; Flemish, *Ronse*), a town in Belgium, province of East Flanders, 24 miles south of Ghent; has manufactures of thread, lace, linen and woollen cloth, tobacco, &c. Renaix dates from the 8th century. Pop. 16,003.

Renan (rē-nän), JOSEPH ERNEST, orientalist, historian, and essayist, was born at Tréguier, in Brittany, Feb. 27, 1823, and studied at the seminary of St. Sulpice, Paris, but in 1845 gave up all intention of becoming a priest, and devoted himself to historical and linguistic studies, especially the study of oriental languages. In 1848 he obtained the Volney prize for an essay on the Semitic languages. In 1849 he was sent by the Academy of Inscriptions and Belles Lettres on a mission to Italy, and in 1860 on a mission to Syria. In 1862 he was appointed professor of Hebrew, Chaldee, and Syriac in the Collége de France, but the sceptical views manifested in his Vie de Jésus (1863) raised an outcry against him, and he was removed from his chair, to be restored again, however, in 1871. This work, the publication of which caused intense excitement throughout Europe, was the first part of a comprehensive work on the History of the Origins of Christianity (Histoire des Origines du Christianisme), which includes Les Apôtres (1866), St. Paul (1867), L'Antéchrist (1873), Les Évangiles (1877), L'Église Chrétienne (1879), and Marc Aurèle (1882), all written from the sceptical stand-point. He became a member of the Academy in 1878, and rector of the Collége de France in 1883. Renan's latest important work was the History of the People of Israel (1887–94, five vols.). Other works are Études d'Histoire Religieuse; Discours et Conférences; Souvenirs d'Enfance et de Jeunesse. He died in 1892.

Renard the Fox, the name of an epic fable in which the characters are animals, the fox being the hero, and which in various forms was extremely popular during the middle ages, and for many years afterwards. It is known in several forms, differing from each other in the episodes. In Latin it appears in a poem of considerable length belonging to about 1150; the oldest known German version is that of a minnesinger Heinrich der Glichesære, belonging to a period not much later. An excellent Dutch version of the fable appeared in Flanders about 1250, under the title Reinaert de Vos (Renard the Fox), and this subsequently received modifications and enlargements. In 1498 a version in Low German, probably by Herman Barkhusen, a printer of Rostock, appeared. It was evidently taken from the prose version in Dutch, of which Caxton published an English translation. On this Low German version was founded Goethe's rendering (1794) into modern German hexameters. In France the history of Renard was enormously popular, and from the end of the 12th to the middle of the 14th centuries many forms of it appeared. There have been several English forms of the fable, as well as Danish, Swedish, &c. It relates the adventures of the fox at the court of the king of beasts, the lion, and details with great spirit and humour the cunning modes in which the hero contrives to outwit his enemies, and to gain the favour of his credulous sovereign. The poem may be regarded as 'a parody of human life.' There is no personal satire in it, but the allusions to the weak points in the social, religious, and political life of the time are numerous and unmistakable.

Rendsburg, a town of Prussia, in the province of Schleswig-Holstein, on the Eider, 54 miles N.N.W. of Hamburg. It is advantageously situated for trade, being connected with the North Sea by the Eider, and being also on the line of the recently constructed North Sea and Baltic ship canal, in connection with which great harbour works have been carried out. Pop. 13,721.

René (rē-nā'), or RENA'TUS I. of Anjou, titular king of Naples, second son of Louis II. of Naples, duke of Anjou, and Iolante, daughter of John, king of Aragon, was born at Angers in 1409. Having in 1420 married Isabella, daughter of Charles II., duke of Lorraine, on the death of his father-in-law in 1431 he laid claim to that dukedom; but Count Antony of Vaudemont, son of the brother of Charles II., contested his right, drove him out of Lorraine, captured him, and held him a prisoner for several years. In 1434 his elder brother, Louis III. of Anjou, who had been in actual possession of the throne of Naples and Sicily, died and left to him Provence, Anjou, Naples, Sicily, and Jerusalem. In 1437 René bought his liberty and the acknowledgment of his right to Lorraine for 400,000 florins, and in the following year he led an army to Naples, where his claims were disputed by Alfonso, king of Aragon. René was unsuccessful, and in 1442 returned to Lorraine, the government of which he gave up to his son John, who, after his mother Isabella's death, entered into full possession under the title of John II. On this René retired into Provence, and devoted himself to agriculture, manufactures, literature, and art. His subjects called him the Good, and his court was the resort of poets and artists. His closing

years were spent in the company of his daughter Margaret, the exiled queen of Henry VI. of England. His sons having all died before him he made a will in favour of Louis XI. of France, and at his death, which took place at Aix in 1480, most of his possessions fell to the French crown.

Renfrew, or RENFREWSHIRE, a county of Scotland, bounded by Ayrshire, Lanarkshire, Dumbartonshire, and the river and Firth of Clyde; area, 156,785 acres, of which about 95,000 acres are cultivated. The most elevated ground occurs in the south-west and south-east, but the hills attain no great height, the loftiest summit in the county being about 1200 feet or 1300 feet above sea-level. In the centre and towards the north the land is rich and highly cultivated. The chief rivers are the White and the Black Cart, the Gryffe, &c. The south-east part of the county is included in the great coal district of the west of Scotland. Good freestone for building is quarried. Renfrewshire derives its principal importance from its manufactures and shipping, including as it does Paisley, Greenock, and Port-Glasgow, as well as the county town, Renfrew. It returns two members to parliament. Pop. 290,790.—The town of Renfrew is an ancient royal and parliamentary burgh, 6 miles W.N.W. of Glasgow, close to the Clyde. In 1404 it gave the title of baron to the heir-apparent to the Scottish throne, a title still borne by the Prince of Wales. The principal industries are iron ship-building, engineering, and iron-founding. Renfrew unites with Kilmarnock, Rutherglen, Port-Glasgow, and Dumbarton in sending a member to parliament. Pop. 6756.

Reni. See *Guido Reni*.

Ren'nell, JAMES, English geographer, born in 1742, died in 1830. At thirteen he entered the navy, whence he passed into the East India Company's military service, in which he rose to the rank of major. He was chiefly employed in engineering and surveying work, and latterly held the appointment of surveyor-general of Bengal. He retired on a pension in 1776, returned to England in 1778, and henceforth lived in London. The remainder of his long life he devoted to geographical labours, maintaining a correspondence with many of the most learned men of Europe, and giving to the world from time to time numerous geographical works of great value. These include Bengal Atlas, Memoir of a Map of Hindustan, Geographical System of Herodotus, Treatise on the Comparative Geography of Western Asia, On the Topography of the Plain of Troy, Illustrations of the Expedition of Cyrus, &c.

Rennes (renn), a city of France, formerly capital of Brittany, at present capital of the department of Ille-et-Vilaine, situated at the confluence of the rivers Ille and Vilaine. It is traversed from east to west by the Vilaine, which divides it into the High and the Low Town, and is crossed by four bridges. The High Town is handsome and regular, having been rebuilt after a dreadful conflagration which took place in 1720. The most remarkable buildings are the cathedral, a modern Grecian building, the Palais de Justice, the Hôtel de Ville, and the Lycée. The industries include sail-cloth, linen, shoes, hats, stained paper, &c. Rennes is the seat of an archbishop, the head-quarters of a corps d'armée, and has a large arsenal and barracks. Dugueslin and Sainte Foix were born here. Pop. 65,102.

Rennet, the prepared inner surface of the stomach of a young calf. It contains much pepsine, and has the property of coagulating the casein of milk and forming curd. It is prepared by scraping off the outer skin and superfluous fat of the stomach when fresh, keeping it in salt for some hours, and then drying it. When used a small piece of the membrane is cut off and soaked in water, which is poured into the milk intended to be curdled.

Rennet, or REINETTE, a kind of apple, said to have been introduced into England in the time of Henry VIII. It is much grown in France and Germany. The rennet is highly esteemed as a dessert fruit.

Rennie, GEORGE, civil engineer, eldest son of John Rennie (see next article), was born in Surrey in 1791, and was educated at St. Paul's School, London, and at Edinburgh University. In 1811 he became associated with his father in business, and on his father's death he formed a partnership with his brother John, and afterwards with his two sons. He constructed many of the great naval works at Sebastopol, Nicolaiev, Odessa, Cronstadt, and in the principal ports of England, and executed several English and continental railways. He died in 1866.

Rennie, JOHN, a celebrated civil engineer, son of a farmer, was born at Phantassie, East Lothian, in 1761, and was educated at Dunbar and Edinburgh, where he attended

the lectures of Dr. Robinson and Dr. Black on natural philosophy and chemistry. He laboured for some time after this as a workman in the employment of Andrew Meikle, a millwright. In 1780 he went to Birmingham, with letters of introduction to Messrs. Boulton and Watt at Soho, near that city, and by that firm he was afterwards employed in London in the construction of machinery for the Albion Flour-mills, near Blackfriars Bridge. In London his reputation rapidly increased, until he was regarded as standing at the head of the civil engineers of Great Britain. Numerous bridges, canals, docks, and harbours bear testimony to his skill: among others, Southwark Bridge, Waterloo Bridge, and London Bridge across the Thames; the Crinan Canal, the Lancaster Canal, and the Avon and Kennet Canal; the London Docks, the East and West India Docks, and docks at Hull, Greenock, Leith, Liverpool, and Dublin; the harbours at Queensferry, Berwick, Howth, Holyhead, Kingstown, and Newhaven; and the government dockyards at Portsmouth, Chatham, Sheerness, and Plymouth. He died in 1821.

Rennie, Sir John, younger son of the preceding, was born in 1794, in London, where he also received his education. About the age of sixteen he left school, and began the study of engineering under his father, whom he succeeded as engineer to the Admiralty, and many of whose designs he carried to completion. Among these were the great system of drainage and land reclamation in Lincolnshire, and the erection of London Bridge, on the opening of which, in 1831, he was knighted. He was considered the highest authority of his time on all questions connected with hydraulic engineering, and was the author of an important work on harbours. He died in 1874.

Rent, in the strict economic sense, the payment which, under conditions of free competition, an owner of land can obtain by lending out the use of it to others. This will be found to consist of that portion of the annual produce which remains over and above the amount required to replace the farmer's outlay, together with the usual profits. The explanation of the existence of a permanent surplus in the product beyond what is thus needed to replace with profits the productive outlay was first given by Anderson in 1777, the theory being developed more at length by Ricardo, with whose name it is commonly associated. In Adam Smith's opinion the demand for food is always so great that agricultural produce can command in the market a price more than sufficient to maintain all the labour to bring it to market and to replace stock with its profits, the surplus value going naturally to the landlord. As against the insufficiency of this statement to meet the central difficulty in the problem, the Ricardian school of economists pointed out that agricultural produce is raised at greater or less cost according to the degree of fertility of different soils, and that even on the same soil, by the law of diminishing returns, a more than proportionate outlay is, after a certain point, required for each additional increase in the produce. The uniform price of agricultural produce, however, as determined in a free market, tends inevitably to be such as to cover with ordinary profits the cost of that portion of the produce which is raised at greatest expense; and there will, therefore, be on all that portion of the produce raised at less expense a surplus over and above what is required to remunerate the farmer at the usual rate of profits. As a corollary to this theory, it will be apparent that rent does not determine the normal value of produce, but is itself determined by it; in other words, that rent is not an element in the cost of production. The Ricardian theory of rent has been frequently called in question, as by Rogers in England and Carey in America; but it has obtained, with certain obvious limitations in respect of the conditions of land tenure, the assent of the majority of modern economists.

Rent, as a legal term, is the consideration given to the landlord by a tenant for the use of the lands or subjects which he possesses under lease. There is no necessity that this should be, as it usually is, money; for capons, horses, corn, and other things, may be, and occasionally are, rendered by way of rent; it may also consist in services or manual operations. It is incidental to rent that the landlord can distrain—that is, seize and sell the tenant's chattels in order to liquidate the rent. Sometimes the owner transfers to another by deed or otherwise the right to a certain rent out of the lands, that is termed a *rent-charge*, and the holder of it has power to distrain for the rent, though he has no right over the lands themselves.

Renton, a town of Scotland, in Dumbartonshire, 3 miles north of Dumbarton, on the Leven, carries on calico-printing, bleach-

ing, and dyeing. In the town is a monument to Smollett the novelist, who was born in the neighbourhood. Pop. 5256.

Renunciation, in law, the act of giving up a right. In England it is applied to the act of an executor who declines to take probate of the will of his testator. In Scotland there are several applications of the term. Renunciation by an heir is, where, rather than enter upon the property to which he is entitled, and thus become liable for the encumbrances upon it, he prefers to renounce his character of heir. Renunciation of a lease is the same as the surrender of a lease in England.

Renwick, JAMES, Scottish Covenanter, born at Minnihive, Dumfries-shire, 1662. He studied at Edinburgh University, where, on declining to take the oath of allegiance, he was refused a degree. On the advice of the Covenanters, with whom he threw in his lot after the execution of Cargill in 1681, he went to Holland, and was ordained at Groningen, immediately returning to Scotland, and engaging in the difficult and dangerous duties of a minister of the 'hill-folk.' On the proclamation of James II. in 1685 he went with 200 men to Sanquhar, and published a declaration disowning him as a papist, and renouncing his allegiance. A reward was then set upon his head, and after many wonderful escapes he was captured, condemned, and executed, Feb. 17, 1688.

Renwick, JAMES, LL.D., physicist, born in Liverpool 1790, died in New York 1863. He was educated at Columbia College, New York, and from 1820 to 1850 was professor of physics and chemistry in that institution. He wrote a number of works connected with the sciences in which he had to give instruction, such as Outlines of Natural Philosophy; Treatise on the Steam Engine; Elements of Mechanics, &c.; also Life of John Jay and Alexander Hamilton; Life of De Witt Clinton; besides editing various other works.—His son JAMES was known as a distinguished architect having designed many churches and other buildings, including the Roman Catholic cathedral of New York, the Smithsonian Institution, Vassar College, &c.

Rep, or REPP, a woollen dress fabric with a finely-ribbed surface, so woven that the ribs run transversely and not lengthways as in corded fabrics.

Repairs, in law, is the term denoting the repairs done to a house or tenement by the landlord or tenant during the currency of a lease. In England, unless there is an express stipulation to the contrary, repairs fall to be performed by the tenant; but it is usually stated in the lease which party is to do the repairs. A tenant is not bound to repair damages by lightning or other natural casualty. In Scotland the landlord is bound at common law, independently of stipulation, to make all necessary repairs; and if he fails to do so, the tenant may make them himself, and deduct the amount from his rent.

Repeal Movement, the name given to the agitation for the repeal of the Union between Great Britain and Ireland. This agitation commenced almost at the moment of the Union, and has continued to the present time. Robert Emmet sacrificed his life to the cause of repeal in 1803. But the word repeal is most intimately connected with the name and career of Daniel O'Connell, the Irish 'Liberator.' O'Connell died in 1847, and the cause of repeal was taken up by the Young Ireland party of 1848; by the Fenians, whose operations came to a head in 1865–67; and finally by the Home Rule party, organized under the leadership first of Isaac Butt, M.P., in 1870, and next under the leadership of C. S. Parnell, M.P. During the celebrated Parnell Commission of 1888–89, however, the Home Rule party, through their counsel, disclaimed all desire for repeal, maintaining that their aims were confined to the obtaining of Home Rule in the strict, or restricted, sense of the word.

Repeat, in music, a sign that a movement or part of a movement is to be played or sung twice.

Repeater Watch, a watch that repeats the hour, striking the hour, or hour and quarters, or even hour, quarters, and odd minutes on the compression of a spring.

Repeating Pistol. See *Revolver*.

Replev'in, in English law, is an action brought to recover possession of goods illegally seized, the validity of which seizure it is the regular mode of contesting.

Rep'lica, in the fine arts, is the copy of a picture, &c., made by the artist who executed the original.

Reporting, PARLIAMENTARY, is the process by which the debates in parliament are made known to the public. Previous to the year 1711 no regular publication of reports can be said to have been made. After 1711 speeches reproduced from notes furnished sometimes by the members themselves began to appear regularly in periodicals. Boyer's

Historical Register, an annual publication, gave a pretty regular account of the debates from the accession of George I. to the year 1737. In 1735 the Gentleman's Magazine began a monthly publication of the debates, the names of the speakers being suppressed, with the exception of the first and last letters; but the reports were necessarily very inaccurate, as may be judged from the manner in which they were got up. Cave, the bookseller, and his assistants gained admission to the houses of parliament, and surreptitiously took what notes of the speeches they could, and the general tendency and substance of the arguments; this crude matter was then brought into shape for publication by another hand—work upon which Guthrie the historian and Dr. Johnson were employed. In 1729, and again in 1738, the House of Commons had characterized the publication of debates as 'an indignity to, and a breach of the privilege of, this house,' and in 1747 Cave was called to account; but the reports continued to appear without the proper names of the speakers, and under the heading of 'Debates in the Senate of Lilliput.' In 1771 several printers were ordered into custody for publishing debates of the House of Commons. The sympathy of the public was with the printers; the lord mayor and Alderman Oliver were committed to the Tower for refusing to recognize the Speaker's warrant for the arrest of the printers, and the popular excitement was intense; but in 1772 the newspapers published the reports as usual, and the house quietly gave up the struggle. Henceforth the system of reporting parliamentary debates gradually developed till it reached its present very perfect condition. For long, however, it was considerably hampered by the want of any special place in the house for the reporters; but in the new houses of parliament special galleries and rooms have been fitted up for them, and all necessary conveniences provided.

A single newspaper requires a large staff of reporters, as they have to relieve each other at regular intervals—usually every quarter of an hour. One reporter takes his place in the reporters' gallery, where he remains taking notes for say fifteen minutes, when he is relieved by another reporter; he then retires to the reporters' room, transcribes his shorthand notes, which takes him some time to do, and is then ready to proceed again to the gallery, repeating the same process till the house rises. There is thus always one reporter in the house, while the rest are transcribing their notes, and in this way the printing of the speeches may be proceeding even while they are in course of delivery, if they are very long. Instances are given of the proof-sheets of the greater part of a speech being placed in the hands of the speaker of it as soon as he has resumed his seat. By means also of the electric telegraph and the telephone introduced into the houses of parliament, provincial papers are placed in the same position with regard to freshness of reports as the metropolitan ones.

Notwithstanding the facilities that have thus been given for parliamentary reporting with the full cognizance of the house itself, and notwithstanding the expectation and desire of members to see their speeches reported in the newspapers, the standing order that renders this proceeding illegal still remains unrepealed, and until 1875 any member of the House of Commons could obtain the withdrawal of reporters by calling the attention of the speaker to the presence of strangers; but since the motion of Mr. Disraeli on the 27th of April in that year, it is necessary to obtain a vote of the house on the question of the withdrawal of strangers. The annual publication of Hansard's Parliamentary Debates, compiled from the daily papers and local reports, corrected by the members themselves, is the only approach to an official report of parliamentary proceedings in Great Britain; but the question has been raised whether official verbatim reports ought not to be provided by a staff of reporters employed by government. Such reports have been adopted in the colonies and in most foreign countries. In the case of the latter the official are the only reports, and are sold to the newspapers, which are not represented at the debates.

Reports, in regard to courts of law, statements containing a history of the several cases, with a summary of the proceedings, the arguments on both sides, and the reason the court gave for its judgment. In England reports of law cases are extant from the reign of Edward II. Up to the time of Henry VIII. the reports were taken officially at the expense of the government, and published annually under the name of Year-books; but afterwards, until 1865, the reports were made by private individuals in the various courts. In 1865 an improved system of law reporting was

instituted by the English bar under the superintendence of the Council of Law Reporting, who publish what are called the 'authorized reports.' They have no monopoly, however, for several legal journals publish contemporaneous reports. The reports of cases in the Scotch courts are furnished by periodical legal journals and private professional publications.

Repoussé (rē-pö'sā), a kind of ornamental metal-work in relief. It resembles embossed work, but is produced by beating the metal up from the back, which is done with a punch and hammer, the metal being placed upon a wax block. By this means a rude resemblance to the figure to be produced is formed, and it is afterwards worked up by pressing and chasing the front surface. The finest specimens of this style are those of Benvenuto Cellini of the 16th century.

Representation of the People Act, 1884, an act which, with the subsequent Redistribution of Seats Act (1885), is the latest reform of importance in the electoral system of Great Britain. It establishes a uniform household franchise and a uniform lodger franchise in boroughs and counties; an occupation franchise wherever the land or tenement occupied is of £10 clear yearly value; and a service franchise. See *Britain*.

Representative Government is that form of government in which either the whole of a nation, or that portion of it whose superior intelligence affords a sufficient guarantee for the proper exercise of the privilege, is called upon to elect representatives or deputies charged with the power of controlling the public expenditure, imposing taxes, and assisting the sovereign in the framing of laws. See *Constitution*.

Representative Peers are those peers who represent Scotland and Ireland in the House of Lords. The Scottish peers send to the House of Lords sixteen representatives, who are elected immediately after each general election and sit till parliament is dissolved. The Irish peers elect twenty-eight representatives for life.

Reprieve (re-prēv'), the suspension of the execution of the sentence passed upon a criminal for a capital offence. A reprieve may be granted in various ways:—First, by the mere pleasure of the sovereign; second, when the judge is not satisfied with the verdict, or any favourable circumstance appears in the criminal's character; third, when a woman capitally convicted pleads pregnancy; and lastly, when the criminal becomes insane.

Repri'sal, Letters of. See *Marque, Letter of*.

Reprobation, in theology, is the doctrine that all who have not been elected to eternal life have been reprobated to eternal damnation. This doctrine was held by Augustine and revived by Calvin; but most modern Calvinists repudiate it in the sense usually given to it.

Reproduction, the process by which animals perpetuate their own species or race. Reproduction may take place in either or both of two chief modes. The first of these may be termed *sexual*, since in this form of the process the elements of sex are concerned—male and female elements uniting to form the essential reproductive conditions. The second may be named *asexual*, since in this latter act no elements of sex are concerned. The distinctive character of sexual reproduction consists in the essential element of the male (*sperm-cell* or *spermatozoön*) being brought in contact with the essential element of the female (*germ-cell*, *ovum*, or *egg*), whereby the latter is fertilized or impregnated, and those changes thereby induced which result in the formation of a new being. Whether these elements, male and female, be furnished by one individual or by two—or in other words whether the sexes be situated in separate individuals or not—is a fact of immaterial consequence in the recognition and definition of the sexual form of the process. The reproductive process, therefore, may be (I.) *Sexual*, including (A) Hermaphrodite or Monœcious parents possessing male or female organs in the same individual, and these may be (*a*) self-impregnating (for example, the tape-worm), or (*b*) mutually impregnating (for example, the snail); and (B) Dicœcious parents, which may be (1) Oviparous (for example, most fishes, birds, &c.), (2) Ovo-viviparous (for example, some amphibians and reptiles), or (3) Viviparous (for example mammals). Or the reproductive process may be (II.) *Asexual*, including the processes of (A) Gemmation or budding (internal, external, continuous, or discontinuous), and (B) Fission (transverse, longitudinal, irregular).

The most perfect form of the reproductive process is best seen in the highest or vertebrate animals, where the male elements are furnished by one form, and the female elements by another. The male element, with its characteristic sperm-cells or spermatozoa, is brought into contact with the female ova in various ways. The ova when

impregnated may undergo development external to the body of the parent, and be left to be developed by surrounding conditions (as in the eggs of fishes); or the parent may (as in birds) incubate or hatch them. Those forms which thus produce eggs from which the young are afterwards hatched are named *oviparous* animals. In other cases (as in the land salamanders, vipers, &c.) the eggs are retained within the parent's body until such time as the young are hatched, and these forms are hence named *ovo-viviparous;* whilst (as in mammalia alone) the young are generally completely developed within the parent's body, and are born alive. Such animals are hence said to be *viviparous.* In the higher mammals, which exhibit the viviparous mode of reproduction in fullest perfection, the mother and embryo are connected by a structure consisting partly of fœtal and partly of maternal tissues, and which is known as the *placenta.* (See *Placenta.*) In the tape-worms we find familiar examples of normal hermaphrodite forms. Each segment or *proglottis* of the tape-worm —which segment constitutes of itself a separate zoöid or part of the compound animal— contains a large branching ovary, developing ova or eggs, and representing the female organs, and also the male organ or testis. These organs between them produce perfect or fertilized eggs, each of which under certain favourable conditions is capable of developing into a new tape-worm. The snails also form good examples of hermaphrodite animals, and illustrate organisms which require to be mutually impregnated in order to produce fertilized eggs—that is to say, the male element of one hermaphrodite organism must be brought in contact with the female element of another hermaphrodite form before the eggs of the latter can be fecundated. See also *Fission, Gemmation, Generation, Ovum, Parthenogenesis,* &c. As to reproduction in plants, see *Botany.*

Reptiles, or REPTILIA, a class of vertebrates, constituting with the birds, to which they are most closely allied, Huxley's second division of vertebrates, Sauropsida. Reptiles, however, are generally regarded as occupying a separate place in the animal kingdom, between birds and amphibians. Reptiles differ from amphibians chiefly in breathing through lungs during the whole period of their existence; and from birds in being cold-blooded, in being covered with plates or scales instead of feathers, and in the forelegs (as far, at least, as living reptiles are concerned) never being constructed in the form of wings.

The class may be divided into ten orders, four of which are represented by living forms, while six are extinct. The living orders are the Chelonia (tortoises and turtles), the Ophidia (serpents and snakes), the Lacertilia (lizards), and Crocodilia (crocodiles and alligators). The extinct orders are: Ichthyopterygia (Ichthyosaurus), Sauropterygia (Plesiosaurus), Anomodontia (Rhynchosaurus, &c.), Pterosauria (Pterodactylus), Deinosauria (Megalosaurus, &c.), and Theriodontia. The class is also divided into two sections, Squamata and Loricata, according as the exo-skeleton consists simply of scales, or of bony plates in addition to the scales.

The exo-skeleton varies greatly in its development throughout the class. As in the tortoises and turtles and crocodiles it may attain, either separately or in combination with the endo-skeleton, a high development. In serpents and many lizards it is moderately developed, while in some lizards the skin is comparatively unprotected. The skeleton is always completely developed and ossified. The vertebral column in the quadrupedal forms is divided into four or five regions, less distinctly differentiated, however, than in the mammals. The ribs differ considerably in their mode of attachment to the vertebræ, but are always present, and in a state of greater development than in the amphibians. The body, except in the case of the tortoises, is of an elongated form. The limbs are very differently developed in the different species. In the serpents and some lizards they are completely wanting or atrophied; in other lizards they are rudimentary; while in the remainder of the class sometimes the anterior and sometimes the posterior limbs are developed, and not the others. In no case are the limbs developed to the extent to which they are developed in birds and quadrupeds, these members seldom being of sufficient length to keep the body from the ground. In some of the forms, living or extinct, the limbs are modified for swimming or for flight. The lower jaw is connected with the skull through the intervention of a quadrate bone, and, as this often projects backwards, the opening of the mouth is very great, and may even extend beyond the base of the skull. Teeth, except in the turtles and tortoises, are present, but are adapted rather for seizing

and holding prey than masticating food, and, except in the crocodiles, are not sunk in sockets. The skull possesses a single occipital condyle, by means of which it articulates with the spine. The brain is small compared with the size of the skull. The muscular system is developed more like that of the birds and mammals than that of the amphibians or fishes. The intestinal tract is generally differentiated into an œsophagus, stomach, small intestine, and large intestine. It terminates in a *cloaca*, which is also common to the efferent ducts of the urinary and generative systems. In some forms (as snakes) the stomach, like the gullet, is capable of great distention. The heart has only three cavities, viz. two separate auricles and a single ventricular cavity, usually divided into two by an incomplete partition. Respiration is always performed by the lungs, which are highly organized, and often attain a great size. The ova are in general retained within the body of the parent until the development of the young has proceeded to a greater or less extent, and then expelled and left to the heat of the sun; but in some forms (as snakes and lizards) they are hatched in the interior of the body. Reptiles are found in greatest number, and in most typical form and variety, in the warm or tropical regions of the earth. During winter, or in the colder seasons of the year, most reptiles hybernate, and snakes are notable as periodically moulting their skin or epidermis. See the different orders in separate articles.

Repub'lic (Latin, *res publica*, the common weal, the state), a constitution in which the supreme power in the state is vested, not in a hereditary ruler, but in the citizens themselves. According to the constitution of the governing body a republic may therefore vary from the proudest aristocracy to the most absolute democracy. In the small states of ancient Greece the supreme power was vested in the whole body of the citizens, who met in common assembly to enact their laws. In the oligarchic republics of Genoa and Venice the supreme power was consigned to the nobles or a few privileged individuals. In all modern republics the representative system prevails. Besides the diminutive republics of San Marino, in Italy, and Andorra, on the south side of the Pyrenees, the only republics in Europe at the present day are those of Switzerland and France. Switzerland has been a republic ever since it liberated itself from German rule; and France has been thrice a republic—from 1793 to 1804, from 1848 to 1852, and from 1870 to the present time. Holland was a republic from the separation of the seven provinces from Spain until 1815; Great Britain was nominally a republic from 1649 to 1660; Spain possessed a republican government in 1868–69, and in 1873–74. In the New World the republican form of government prevails universally among the independent states, the most important of all the republics there being the United States. The United States, like Switzerland, is a federative republic, consisting of a number of separate states bound together by a treaty, and having a central government, with power to enact laws binding on all the citizens. Mexico has been a republic since 1824, except during the short-lived empire from 1863 to 1867. Brazil has only been a republic since Nov. 1889.

Republican Party, in United States politics, a name first applied to the party which favoured a strong central government, not acting through the states, but directly upon the people; opposed to the Democratic party, which maintained the rights of individual states. The party was latterly identified with the anti-slavery movement, and was the party of the North in the civil war. It is strongly protectionist.

Repudiation, a refusal on the part of a government to pay the debts contracted by the governments which have preceded it. Repudiation has sometimes been resorted to by the smaller American republics, and by some of the United States, and in Europe there are also instances of a similar kind.

Repulsion, in physics, is a term often applied to the action which two bodies exert upon one another when they tend to increase their mutual distance. It was formerly thought that there were two forces, attraction and repulsion, which balanced and counteracted each other; but it is now known that all apparent repulsion is merely a difference of attractions.

Repute, a technical term in Scots law. See *Habit and Repute*.

Reputed Ownership, in law, is a phrase used of a person who has to all appearances the right and actual possession of property. In England it has been enacted by statute that when a person becomes bankrupt all goods and chattels that are in his possession with the consent of the true owner, and in such a way that he is reputed owner of

them, may in general be claimed by the trustee for the benefit of the creditors. In Scotland the same rule is supposed to exist at common law.

Requena (re-kā'nȧ), a town of Southern Spain, province of Valencia, 41 miles W. of that city; has industries connected with the culture of silk, saffron, grain, fruit, and wine. Pop. 13,527.

Request-note, in the inland revenue, an application to obtain a permit for removing excisable articles.

Requests, Court of, an ancient court of equity, abolished in the reign of Charles I. The name was also given to tribunals of a special jurisdiction for the recovery of small debts, which were abolished, with a few exceptions, by the County Court Act of 1846.

Req'uiem, in the Roman Catholic Church, a solemn musical mass for the dead, which begins in Latin, 'Requiem æternam dona eis,' &c., 'Give to them eternal rest,' &c. Mozart, Jomelli, and Cherubini composed famous requiems.

Reredos (rēr'dos), in ecclesiastical architecture, a screen or partition wall behind an altar, which is invariably ornamented in some manner, and is frequently highly enriched with sculptured decorations, or with painting, gilding, or tapestry. The reredos of St. Paul's, London, the last English cathedral to be provided with a reredos, was unveiled in January 1888.

Re'script (Latin, *rescriptus*, written back), in Roman law, the answers of popes and emperors to questions in jurisprudence propounded to them officially; hence an edict or decree. The rescripts of the Roman emperors constitute one of the authoritative sources of the civil law. The rescripts of the popes concern principally theological matters.

Rescue, in law, the forcible or illegal taking of a person or thing (as a prisoner or a thing lawfully distrained) out of the custody of the law.

Resection, in surgery, the operation of cutting out the diseased parts of a bone at a joint. It frequently obviates the necessity of amputating the whole limb, and, by the removal of the dead parts, leaves the patient a limb which, though shortened, is in the majority of cases better than an artificial one. Resection, which is one of the triumphs of modern surgery, became a recognized form of surgical operation in 1850.

Rese'da, a genus of annual, biennial, and perennial herbs and undershrubs, natural order Resedaceæ, of which it is the type. Of the genus two species are natives of Britain: *R. odorāta* (mignonette) and *R. lutĕola* (wild woad). The latter yields a beautiful yellow dye, for which it was formerly cultivated.

Reseda'ceæ, a small natural order of plants, consisting of annual or perennial herbs, more rarely shrubs, with alternate or pinnately divided leaves, and small, irregular, greenish-yellow or whitish flowers. It inhabits Europe and all the basin of the Mediterranean. With the exception of *Reseda odorāta* (mignonette) and *R. lutĕola* (wild woad), most of the species are mere weeds.

Reservation, in the United States, a tract of the public land reserved for some special use, such as schools.

Reserve, in military matters, has several significations. In battle the reserve consists of those troops not in action, and destined to supply fresh forces as they are needed, to support those points which are shaken, and to be ready to act at decisive moments. The reserve of ammunition is the magazine of warlike stores placed close to the scene of action to allow of the supply actually in the field being speedily replenished. The term reserves is also applied to those forces which are liable to be called into the field on great emergencies, for the purposes of national defence; which have received a military training but follow the ordinary occupations of civil life, and do not form part of the standing army. Such reserves now form a part of all national troops organized on a great scale. In Great Britain the reserves consist of the army reserve and the auxiliary forces, namely, the militia, the yeomanry, and the volunteers. (See *Army Reserve*, *Militia*, &c.) In the army estimates for 1896–97 the army reserve numbered 80,100, the militia 140,104, the yeomanry 11,678, and the volunteers 263,528. See also *Naval Reserve*.

Reserve, in banking and insurance, that portion of capital which is set aside to meet liabilities, and which, in banking, is therefore not employed in discounts or temporary loans.

Reserved List, in the British navy, comprises those old and meritorious officers retired from active service who are yet liable, in the event of the active list being exhausted, to be called upon for further service, a contingency, however, not likely to happen. When placed upon the reserved

list they are promoted to the grade next above that which they held previously, and receive the half-pay of the rank to which they are promoted. In the navy estimates for 1896–97 there were only 13 naval officers on the reserved list.

Reservoir (rez'ẽr-vwär), an artificial basin in which a large quantity of water is stored. The construction of a reservoir often requires great engineering skill. In the selection of a site the great object should be to choose a position which will give the means for collecting a large supply of rainfall with as little recourse as possible to artificial structures or excavations. The embankments or dams may be constructed either of masonry or earth-work, but the latter is the more usual, as it is generally the more economical method. Reservoirs in which the dams are built of earth-work must be provided with a waste-weir, to admit of the surplus water flowing over; in the reservoirs of which the dams are built of masonry there is no necessity for a waste-weir, as then the water may be allowed to overflow the wall, there being no fear of its endangering the works. The outlet at the bottom, by which the water to be used is drawn off from the reservoir, may consist either of a tunnel, culvert, or iron pipes provided with suitable sluices. A vast system of reservoirs, called 'tanks,' exists in India, constructed for purposes of irrigation. The reservoirs upon the irrigation canals of Spain are all of masonry; they are circular or polygonal in shape, and the interior face of the wall, which is constructed of large ashlars, is vertical. In France, Italy, and particularly in England, the preference is given to earthen dams. Sometimes natural lakes are used as reservoirs, instances of which are Loch Katrine for the water supply of Glasgow, and Thirlmere for that of Manchester. In these cases means are adopted for raising or lowering the surface of the water, the difference between the lowest and the highest level of the surface, multiplied by the area of the lake, giving the measure of its available storage. Distributing reservoirs for towns are generally built of masonry, but are sometimes of iron. They are placed high enough to command the highest part of the town, and are capacious enough to contain half a day's supply, their chief use being to store the surplus water during the night. Several catastrophes have occurred from the bursting of imperfectly formed reservoirs. The bursting of the Dale Dyke reservoir at Sheffield, in March 1864, resulted in the loss of 300 lives and the destruction of an immense amount of property. See also *Johnstown*.

Reset' of Theft, in Scots law, the offence of receiving goods with the knowledge that they are stolen, and with the intention of concealing and withholding them from the owner. See *Receiver of Stolen Goods*.

Reshd, a town of Persia, capital of the province of Gilan, 150 miles north-west of Teheran, near the Caspian Sea. Reshd is a well-built town, and is the centre of the silk trade of Persia, and through its port Enzelli, 16 miles distant, carries on a considerable trade with Russia. Pop. 41,000.

Reshid Pasha, a Turkish statesman, born at Constantinople in 1800, died in 1858. He represented the Porte in the courts of France and Britain, was several times made grand vizier, supported the policy of Sir Stratford Canning, and was the chief of the party of progress in Turkey.

Residuary Legatee, in law, the person to whom the surplus of the personal estate, after the discharge of all debts and particular legacies, is left by the testator's will.

Resignation, in Scots law, the form by which the vassal returns the fee or feu into the hands of the superior.

Res'ina, a town of Italy, in the province and 6 miles south-east of Naples, on the Gulf of Naples. It stands near Herculaneum, and is the usual starting-place for the ascent of Vesuvius. Pop. 13,626.

Resins, a class of vegetable substances insoluble in water, soluble in alcohol, and easily softened or melted by heat. Resins are either neutral or acid; they are transparent or translucent; they have generally a yellow-brown colour; are somtimes elastic, but more generally friable and hard. They become electric when rubbed. Resins may be divided into three classes:—(1) Those which exude spontaneously from plants, or from incisions in the stems and branches. They are generally mixtures of gum-resins and volatile oils. The principal resins belonging to this class are benzoin, dragon's-blood, Peru balsam, storax, copaiba, copal, elemi, guaiacum, jalap, lac, myrrh, sandarach, and turpentine. (2) Resins extracted from plants by alcohols; they generally contain definite carbon compounds. The principal resins belonging to this class are gum ammoniacum, angelica-root, Indian hemp, cubebs, manna, and squill. (3) Fossil resins, occurring in coal or lignite beds, amber, asphalt, copaline, fossil caoutchouc, &c.

Resist, in calico-printing, a paste applied to calico goods to prevent colour or mordant from fixing on the parts not intended to be coloured. Resists may be used either mechanically or chemically.

Resistance, ELECTRICAL, the opposition which a conductor offers to the flow of electricity, the conductor being removed so far from neighbouring conductors that their action will be very small, and maintained at the temperature of 0° C. The unit of resistance adopted by the British Association is called an ohm (which see).

Res Judica'ta, in law, is a legal point on which, as between two parties, judgment has been given by a supreme court, and which, therefore, cannot be reopened.

Resolution, in music, the movement of a dissonance into the consonant harmony for which it creates in the ear an expectation. This movement is effected by raising or depressing the note a tone or a semitone, according to the rules of harmonical progression.

Resolution of Forces, in dynamics, the reverse of composition of forces. When a number of forces act at a point, the effect of all the forces may be produced by a single force; this single force is called the resultant force, and is said to be composed of the actual forces. On the other hand, a force acting at a point may be replaced by a number of forces, and these forces are called resolved parts of the original force.

Res'onance, in acoustics, a strengthening of sound. When a person speaks in an empty room the walls reflect the words. Suppose we have only to deal with one reflecting surface, at a distance of 112·5 feet from the speaker; there will be an interval of one-fifth of a second between the word and its echo, and the sound will be distinguished from its reflection; for any shorter distance the echo will merely strengthen the sound. Resonance includes such strengthening of sound as occurs in sounding-boards and the bodies of musical instruments.

Resor'cin, a colourless crystalline compound prepared on the large scale by the action of sulphuric acid on benzene, and by the treatment of the resulting compound with caustic soda. It yields a fine purple-red colouring matter and several other dyes used in dyeing and calico-printing.

Respiration, the act of respiring or breathing. Respiration is that great physiological function which is devoted to the purification of the blood by the removal, through the media of the breathing organs, of carbonic acid and other waste products, and at the same time to the revivifying of the blood by the introduction of the oxygen of atmospheric air. It is thus partly excretory and partly nutritive in its character. The other waste products, besides carbonic acid, which are given off in the process of animal respiration are water, ammonia, and organic matters; but carbonic acid is by far the most important.

In man and the higher animals respiration is carried on by the breathing organs or lungs. The blood is conveyed to the breathing organs by special vessels, the right side of the heart in birds and mammals being exclusively employed in driving blood to the lungs for purification. The blood is sent through the pulmonary or lung capillaries in a steady stream, and passes through these minute vessels at a rate sufficient to expose it to the action of the oxygen contained in the air-cells of the lung. The essential part of the function of respiration, namely, the exchange of carbonic acid gas for oxygen, thus takes place in the lung, where the dingy-hued venous blood becomes converted into the florid red arterial blood. Respiration includes the physical acts of inspiration and expiration, both involuntary acts, although they may be voluntarily modified. From fourteen to eighteen respiratory acts take place per minute, the average quantity of air inhaled by a healthy adult man being about 30 cubic inches, a slightly smaller quantity being exhaled. This definite volume of air which ebbs and flows is termed *tidal* air. The quantity (about 100 cubic inches) which may be taken in a deep inspiration, in addition to the tidal air, is termed *complemental* air. The quantity of air (75 to 100 cubic inches) remaining in the chest after an ordinary expiration has expelled the tidal air, is named *supplemental* or reserve air, and this may be in greater part expelled by a deeper expiration; whilst a quantity of air, also averaging from 75 to 100 cubic inches, always remains in the lungs after the deepest possible expiratory effort, and cannot be got rid of. This latter quantity is therefore appropriately named *residual* air. The difference in the mode of breathing between the two sexes is clearly perceptible. In man it is chiefly *abdominal* in its character; that is to say, the lower part of the chest and sternum, together with the abdominal muscles, participate before

the upper portions of the chest in the respiratory movements; whilst in women the breathing movements are chiefly referable to the upper portions of the chest. In women, therefore, breathing is said to be *pectoral*.

Every volume of inspired air loses from 4½ to 5 per cent of oxygen and gains rather less carbonic acid. The quantity of carbonic acid given off varies under different circumstances. More carbonic acid is excreted by males than by females of the same age, and by males between eight and forty than in old age or in infancy. An average healthy adult man will excrete more than 8 oz. of carbon in 24 hours. Hence the necessity for repeated currents of fresh air in meeting places and places of public entertainment, in halls and in churches, and for the proper ventilation of sleeping apartments. The breathing of an atmosphere vitiated by organic matter and carbonic acid results in imperfect oxygenation of the blood, is accompanied or followed by headaches, drowsiness, and lassitude, and is the source of many serious and even fatal disorders.

While in man and the more highly organized animals respiration is carried on by the lungs, in fishes it is effected by the gills. The essential feature of any breathing organ is a thin membrane, having the blood on one side and air, or water containing air, on the other; and the essential feature of respiration is an interchange of products between the blood and the atmosphere, oxygen passing from atmosphere into the blood, and carbonic acid and organic matters from the blood into the atmosphere. In the protozoa no respiratory organs are specialized, but the protoplasm of which the bodies of these animals are composed, has doubtless the power of excreting waste matters, as well as of absorbing nutritive material. Even in comparatively high organisms, where no specialized breathing organs are developed, the function of respiration may be carried on by the skin or general body surface—the integument being, as in the highest forms, intimately correlated in its functions to the breathing process. Thus in earthworms, lower crustacea, &c., the breathing appears to be solely subserved by the body-surfaces.

Respiration goes on in plants as well as in animals, the plant in the presence of light exhaling oxygen and inhaling carbonic acid, and thus reversing the action of the animal.

Respiration, Artificial. See *Drowning*.

Respira'tor, a mouth-covering, which gives warmth to the air inhaled, and is used by persons having delicate lungs. It is constructed of a series of layers of very fine silver or gilt wires placed closely together, which are heated by the exhalation of the warm breath, and in turn heat the cold air before it is inhaled. Other respirators, designed to exclude smoke, dust, and other noxious substances, are used by firemen, miners, cutlers, grinders, and the like.

Respir'atory Sounds, in medicine, the sounds made by the air when being inhaled or exhaled, as heard by the ear applied directly to the chest, or indirectly through the medium of the stethoscope. The respiratory sounds are of the highest importance in the diagnosis of diseases of the chest and bronchial tubes.

Res'pite, the temporary suspension of the execution of a capital offender. See *Reprieve*.

Respon'dent, in law, the designation of the party requiring to answer in a suit, particularly in a chancery suit.

Responden'tia, a loan on the security of a ship's cargo. It is made on the condition that if the goods are lost, the lender shall lose his money. A similar loan on the security of the ship itself is called *bottomry*.

Responsibility for Crime attaches fully to all above fourteen, if not lunatic. An indefinite measure of responsibility begins to attach at seven, but till fourteen the presumption is in favour of innocence. An infant under seven is held to be incapable of committing crime. Ignorance as to fact, but not ignorance as to law, may remove, or at least lessen, responsibility.

Rest, in music, an interval of silence between two sounds, and the mark which denotes such interval. Each note has its corresponding rest. See *Music*.

Rest-harrow, a common British leguminous plant (*Onŏnis spinōsa*), akin to the brooms. It is plentiful in stiff clay land in some parts, and derives its name from its long and strong matted roots arresting the progress of the harrow. The stems are annual, often woody or shrubby, and hairy; the leaves are generally simple, entire towards the base; the flowers, mostly solitary, large, and handsome, are of a brilliant rose colour. Rest-harrow is also called *cammock*.

Restia'ceæ, a natural order of plants allied to the Cyperaceæ or sedges, and confined to the southern hemisphere, being found chiefly in South Africa and Australia. They are herbs or undershrubs, with matted roots

which bind shifting soil, hard wiry stems, simple narrow leaves, the sheaths of which are usually split, and inconspicuous brown rush-like panicles of flowers. *Restio tectorum* is employed in South Africa for thatching, and the stems of other species are manufactured into baskets and brooms.

Restigouche (res'ti-gōsh), a river which separates New Brunswick from the province of Quebec, flowing N.E. into the Bay of Chaleurs at Dalhousie. It is 200 miles long, is navigable for 16 miles to Campbelton, and forms a tidal estuary for 24 miles. It drains 4000 square miles, and its basin supplies great quantities of timber.

Restitution of Conjugal Rights, in English law, is where either the husband or wife, without sufficient reason, lives separate from the other, in which case, if either party desires it, the divorce and matrimonial court will compel them to come together again.

Restoration, in English history, the re-establishment of Charles II. on the throne, May 29, 1660. The restoration was held as a festival in the Church of England till 1859.

Restorationist, one who believes in a temporary future punishment, but in a final restoration of all to the favour and presence of God. The name is applied to all of whatever sect who hold this belief; to the whole body of Universalists; and to a particular sect of Universalists.

Resurrection, the rising again of the body from the dead to be reunited to the soul in a new life. It has formed a part of the belief of the Christian church since its first formation, and has been embodied as an article in each of the creeds. There are traces to be found of such a belief among heathen nations from a very early period. There can be little doubt that the Jews, particularly those of later times, held the doctrine, though it would be difficult to point to any express indication of it in the Old Testament. It appears, however, to be alluded to in Isaiah xxvi. 19, and is distinctly affirmed in Daniel, chap. xii. 1–3. That the belief in the resurrection was generally held among the Jews at the time of Christ is evident, particularly from the position occupied by the Sadducees, a sect having as its most characteristic feature the denial of the resurrection. Beyond doubt, however, it was the gospel that 'brought life and immortality to light.' At best the notions of a resurrection and future state current prior to the advent of Christ were dim and undefined, and it remained for him to set them in a full clear light, and give evidence and pledge of their reality by his own resurrection. With regard to the information conveyed to us in the New Testament on the doctrine of the resurrection, we are taught that it will be *universal*, extending to the wicked as well as to the righteous, John v. 28, 29; Rev. xx. 13; that there shall be identity, in some sense, between the body which died and the body which shall be raised, 2 Cor. v. 10; that, as regards the resurrection of the righteous, the body, though identical, shall be wonderfully altered, Phil. iii. 21; 1 Cor. xv.; Luke xx. 35, 36; and that, as regards the time of the resurrection, it shall be at the end of this present earthly state, and that it shall be connected with the coming of our Lord to judge the world, 1 Thess. iv. 16.

Connected with this subject is the resurrection of Christ himself from the dead, the corner-stone of the Christian system. The evidence in support of it is marked by the following characteristics:—(1) *The variety of circumstances* under which the risen Saviour appeared. (2) *The circumstantiality* of the testimony given by the different witnesses. (3) *The simplicity and apparent truthfulness* with which the witnesses describe their impressions when the Saviour appeared to them. (4) That *the event borne witness to was completely unexpected by the witnesses;* and (5) That the testimony was published to the world on the very spot where, and at the very moment when, the event was said to have happened. Various attempts have been made to explain away the resurrection of Christ. There is the supposition (1) of fraud; that, according to the statement of the Jews, the disciples stole the body, and then published the story that their Lord was risen. (2) That Jesus had not really died on the cross; that his apparent death was only a swoon, from which he afterwards recovered. (3) That there had been no real resurrection, but that the disciples had been deceived by visionary appearances or hallucinations. (4) That the assertion of the resurrection was originally allegorical. With regard to the significance of the resurrection of Christ, it was (believers assert) the crowning evidence of the divine character of his mission, he himself had spoken of it as what should be the most convincing proof to the world that he really was what he professed himself to be; and in this light it was constantly and

with irresistible conclusiveness appealed to by the apostles in addressing the world.

Resurrection, Congregation of the, a society of Roman Catholic priests founded at Rome in 1836.

Resuscitation. See *Drowning.*

Retainer, in law, the contract between a solicitor and a client, or a solicitor and counsel for professional services, and the document given by the solicitor to a counsel engaging his services. When the counsel is engaged for a particular suit the document is called a *special retainer;* and when he is engaged for all matters of litigation in which such party may be at any time involved, it is called a *general retainer.* The retainer is in all cases accompanied by a preliminary fee called a retaining fee.

Retaining Wall, a wall erected for the purpose of confining a body of water in a reservoir, or for resisting the thrust of the ground behind it. As a general rule the thickness of retaining walls is one-third their height; in reservoir and dock walls of masonry the thickness is about one-half their height.

Retardation, in physics, the diminution of the velocity of a body from the friction of the medium in which the body moves or from the attraction of gravity. The laws of retardation are the converse of those of acceleration.

Re'te Muco'sum, in anatomy, the deepest layer of the epidermis or scarf-skin, resting on the cutis vera or true skin. It is the seat of the colour of the skin, and in the negro contains black pigment.

Retention, in Scots law, a lien; the right of withholding a debt or of retaining property until a debt due to the person claiming this right be duly paid.

Retention of Urine, in medicine, a condition in which the urine cannot be expelled from the bladder at all, or only with great difficulty; to be distinguished from suppression of urine, a condition in which the bladder is empty, the urine not having been secreted by the kidneys. It may be due to some mechanical obstruction, as a calculus, a clot of blood, or a tumour, or to paralysis, &c. If not relieved by means of the catheter or otherwise it may cause rupture of the bladder and death.

Retford, East, a municipal borough in Nottinghamshire, England, 32 miles E.N.E. of Nottingham, on the Idle, here crossed by a bridge connecting East Retford with West Retford. It has foundries, machine-shops, paper and corn mills, &c. East Retford sent two members to the House of Commons from 1571 till 1885, when it ceased to be a parliamentary borough. Pop. 10,603.

Rethel (ret-el), a town of France, department of Ardennes, on the Aisne, 23 miles N.E. of Rheims, with manufactures of merinoes and cashmeres. Pop. 6904.

Rethel (rā'tel), Alfred, German historical painter, born at Aix-la-Chapelle in 1816; studied at Düsseldorf (under Schadow), Frankfort (under Veit and Schwind), and Rome. He died at Düsseldorf in 1859. His greatest works are four frescoes in the town-house of Aix-la-Chapelle representing incidents connected with the life of Charlemagne, other four there being executed from his designs after his death. These are among the finest modern works of the kind. German history and the Bible also furnished him with various subjects, and he painted in water-colour a series of pictures illustrative of Hannibal's passage of the Alps.

Retia'rius, in Roman antiquities, a gladiator who wore only a short tunic and carried a trident and net, with which he endeavoured to entangle and despatch his adversary, who was armed with helmet, shield, and sword.

Reticulated Moulding, in architecture, a member enriched with a raised fillet interlaced in various ways like net-work. It is seen chiefly in buildings in the Norman style.

Reticulated Work, a species of masonry very common among the ancients, in which

Reticulated Work—Roman.

the stones are square and laid lozenge-wise, resembling the meshes of a net, and producing quite an ornamental appearance. It is the *opus reticulatum* of the Romans.

Reticu'lum, the honey-comb bag or second cavity of the complex stomach of ruminants.

Ret'ina, in anatomy, a membrane of the eye, formed by an expansion of the optic nerve, and so constituted as to receive the impressions which result in vision. See *Eye*.

Ret'inite, a fossil resin found in the lignite beds of Devonshire, Hanover, and elsewhere.

Retirement, in the army and navy, is withdrawment from the service with the retention of all or a portion of the pay. In the British army and navy the retirement of officers may be voluntary, but all officers must retire at fixed ages, according to their rank, receiving corresponding retired-pay. (See *Army*.) In the army estimates for 1896–97 the retired pay and gratuities for reduced and retired officers amounted to £1,495,800. In the navy estimates the reserved and retired pay amounted to £669,018.

Retort', a vessel, generally of glass, used in chemistry for distilling liquids. Retorts consist of a flask-shaped vessel, to which a long neck or beak is attached. The liquid to be distilled is placed in the flask and heat applied. The products of distillation condense in the cold neck of the retort, and are collected in a suitable receiver. In gas-making, retorts of iron or fire-clay are used for distilling the coal.

Retreat, a military operation, in which an army retires before an enemy; properly, an orderly march, in which circumstance it differs from a flight. Also a military signal given in the army by beat of drum or sound of trumpet at sunset, or for retiring from exercise or from action.

Retriever Dog, a dog specially trained to fetch game which has been shot, and greatly valued by sportsmen for its sagacity in the field and in the water. The larger and more familiar breed of retrievers is formed by crossing the Newfoundland and setter; the smaller breed is formed by crossing the water-spaniel and terrier. The typical retriever is 20 or more inches high, with a stoutly-built body, strong limbs, webbed toes, and black and curly fur.

Retrograde, a term given to the apparent motion of a planet among the stars when it is in opposition to the motion of the sun in the ecliptic. The motion of a planet in the direction from right to left is said to be *direct*.

Retrogression of the Moon's Nodes, the motion of the moon's nodes—the two points in which the moon's orbit meets the plane of the ecliptic—in the direction opposite to that of the sun's motion in the ecliptic. The moon's nodes slowly change at each revolution of the moon, in the direction from left to right, and make a complete revolution round the earth in 18·6 years.

Return, in law, the sending back of a writ or other process to the court from which it issued by the officer to whom it was addressed, with a written account of what he has done in executing the process, to be filed in the office of the clerk of the court.

Returning Officer, the presiding officer who conducts an election and who returns the persons duly elected. In counties it is usually the sheriff, in boroughs the chief magistrate, or deputies acting for them.

Retz, GILLES DE. See *Rais*.

Retz (rā), JEAN FRANÇOIS PAUL DE GONDI, CARDINAL DE, was born at Montmirail in 1614, died at Paris 1679. Contrary to his own inclinations he was designed by his father, who was general of the galleys, for the church. His instructor was the celebrated Vincent de Paul. As a young abbé he led a very improper life, but his brilliant gifts, his eloquence, his audacity, and his great connections nevertheless enabled him to advance in his ecclesiastical career. In 1643 he received a doctorate at the Sorbonne, and was appointed coadjutor of his uncle the Archbishop of Paris. He was the implacable enemy of Mazarin, and in 1648 became the most energetic and unscrupulous of the leaders of the Fronde. On the fall of Mazarin he was selected as minister by the queen-regent, Anne of Austria, and in 1651 received the cardinal's hat; but on Mazarin's return to power in 1652 he was arrested and imprisoned, first at Vincennes, then at Nantes. He escaped, however, after two years' captivity, and for nearly eight years wandered through Spain, Italy, Holland, Germany, and England. After the death of Mazarin in 1661 he was allowed to return to France, on condition that he should resign his claims to the archbishopric of Paris, receiving instead the rich abbey of St. Denis. During the last seventeen years of his life he lived retired, paid his immense debts, and occupied himself with the composition of his Mémoires, which are inimitable for their historic truth and narrative skill.

Retzsch (rech), MORITZ, German artist, was born at Dresden 1779, died there 1857. He studied at the art academy of his native city, of which he was appointed a professor in 1824. His most celebrated works are his outline illustrations of Shakspere, Goethe, Schiller, Fouqué, and others.

Reuchlin (roiḥ'lin), JOHANN, German scholar, born in 1455 at Pforzheim, died in 1522. He studied at Freiburg, the University of Paris, Bâle, and elsewhere, and became familiar with Latin, Greek, and Hebrew. He was patronized by several of the German princes, and was engaged on various political missions. From 1502 to 1513 he was president of the Swabian federal court. His opposition to the proposal to burn all Hebrew books except the Bible raised a host of fanatical enemies against him, but did him no harm. In 1519 he was appointed professor at Ingolstadt; in 1521 the plague drove him to Stuttgart. During a great part of his life Reuchlin was the real centre of all Greek and Hebrew teaching in Germany. Several of his works had considerable popularity in their time. He sympathized deeply with Luther and the Reformation, but maintained his connection with the Roman Catholic Church to the last.

Reumont (roi'mont), ALFRED VON, German historian, born at Aix-la-Chapelle, August 15, 1808, was educated at Bonn and Heidelberg, and entered the Prussian diplomatic service, filling posts at Florence, Constantinople, and Rome. From 1851 till 1860, when he retired into private life, he was successively Prussian minister at Florence, Modena, and Parma. He died in 1887. He was the author of several valuable works on the history of Italy, including Contributions to Italian History, The Carafas of Maddaloni, History of the City of Rome, &c. He also wrote on the history of art.

Réunion (rā-ū-ni-ōn), formerly BOURBON, an island in the Indian Ocean, between Mauritius and Madagascar, 115 miles from each; area, 1127 square miles. It was annexed by France in 1643, and is an important French colony, now sending a representative to the chamber of deputies, and forming practically almost a department of France. It is very mountainous, the Piton des Neiges reaching a height of 10,069 feet, and the Piton de la Fournaise, an active volcano, of 8294 feet. The soil produces tropical products, sugar being the principal crop. Coffee, cloves, and vanilla are also grown. Destructive hurricanes are frequent. There are no natural harbours, but an artificial harbour has been constructed at Pointe des Galets, at the north-west side of the island; and this harbour is connected by railway with St. Denis (the capital), and all the principal places on the coast. The population, which consists of creoles, negroes, Indian coolies, Chinese, Malays, &c., is 179,639.

Reus (rā-ụs'), a city of Spain, in Catalonia, in the province and 10 miles west of Tarragona, in a plain at the base of a chain of hills, about 4 miles from the port of Salou on the Mediterranean. Reus is now, next to Barcelona, the most flourishing manufacturing town of Catalonia, the staples being silk and cotton. Imitation French wines are largely made. Pop. 27,595.

Reuss (rois), two principalities of Central Germany, consisting of several separate territories situated between Prussia, Saxony, and Bavaria, and belonging to an older and a younger line of the family of Reuss. Reuss-Greiz, the territory of the elder line, comprises an area of 122 square miles, with a population of 55,994; the territory of the younger line, Reuss-Schleiz-Gera, has an area of 318 square miles, with a pop. of 110,598. Both principalities have been members of the German Empire since 1871, each sending one member to the federal council and one representative to the Reichstag.

Reuter (roi'tėr), FRITZ, German humorist, was born in 1810, and educated at Rostock and Jena. He became an active member of the student society 'Germania,' which cost him seven years' imprisonment in Prussian fortresses. Returning home in 1840 he supported himself first by farming, then by teaching, and finally by literary work. His first literary venture was a volume of humorous poems in Low German (Läuschen and Riemels, 1853), which met with extraordinary success. His greatest work is Olle Kamellen, a series of prose tales, which stamped him as the greatest writer of Platt-deutsch and one of the greatest humorists of the century. He died at Eisenach in 1874.

Reuter (roi'tėr), PAUL JULIUS, BARON, born at Cassel in 1821, was connected with the electric telegraph system from the beginning, and in 1849 established Reuter's News Agency at Aix-la-Chapelle. In 1851, on the laying of the cable between Calais and Dover, he transferred his chief office to London, and became a naturalized Englishman. As the telegraphic system extended he increased his staff of agents, until the newspaper press, the foreign bourses, and all banking, shipping, and trading companies became dependent in a great measure on Reuter's Agency for the latest information from all parts of the world. In 1865 he converted his agency into a limited liability

company, of which he was managing director until 1878. In 1871 he received the title of baron from the Duke of Coburg-Gotha. He has laid down several important telegraphic cables.

Reutlingen (roit'ling-ĕn), a town of Würtemberg, 20 miles south of Stuttgart; has manufactures of cottons, woollens, lace, leather, &c. It is of considerable antiquity, and long maintained the rank of a free imperial city. It was incorporated with Würtemberg in 1802. Pop. 17,319.

Reval, or REVEL, a fortified seaport of Russia, capital of Esthonia, on a small bay in the Gulf of Finland. It consists of two parts, the old or upper town, surrounded by walls and situated on a rocky height, and the lower town on the beach. Reval was an important seaport of the Hanseatic League, and came into the possession of Russia in 1710. It contains several ancient churches, a fine modern church with spire 429 feet high, a cathedral, and many interesting antiquities. Its manufactures are unimportant, but its trade is large, the exports being chiefly grain, flax, and spirits, and the imports, coal, iron, cotton, tea, wine, and chemicals. It is much frequented for sea-bathing. Pop. 51,277.

Reveillé (re-vel'ye, from French, *reveiller*, to awaken), the signal given in garrisons at break of day, by beat of drum or sound of bugle, for the soldiers to rise and the sentinels to forbear challenging until the retreat is sounded in the evening.

Revelation, the knowledge of God and his relation to the world, given to men by God himself, and for the Christian contained in the Bible. The earliest revelations, made in the patriarchal age, were preserved till later times, and gradually enlarged during the Mosaic period by successive revelations to chosen individuals, with whom the Bible makes us acquainted under the name of prophets, from Moses to Malachi, God having finally completed his revelations through Christ. See *Christianity*.

Revelation, BOOK OF. See *Apocalypse*.

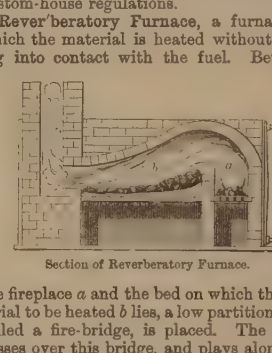
Revelganj', or GODNA, a commercial town of India, in Bengal, near the junction of the Ganges and Ghagra. It has an important local trade. Pop. 14,750.

Revels, MASTER OF THE, an officer in former times appointed to superintend the revels or amusements, consisting of dancing, masking, &c., in the courts of princes, the inns of court, and noblemen's houses, during the twelve Christmas holidays. He was a court official from the time of Henry VIII. to that of George III.

Revenue, the income of a nation derived from taxes, duties, and other sources, for public uses. See articles on the different countries, also *Taxation*, &c.

Revenue Cutter, a sharp-built single-masted vessel, armed, for the purpose of preventing smuggling and enforcing the custom-house regulations.

Rever'beratory Furnace, a furnace in which the material is heated without coming into contact with the fuel. Between



Section of Reverberatory Furnace.

the fireplace *a* and the bed on which the material to be heated *b* lies, a low partition wall, called a fire-bridge, is placed. The flame passes over this bridge, and plays along the flat arch which surmounts the whole, reflecting or reverberating the heat downwards. The reverberatory furnace gives free access of air to the material, and is employed for oxidizing impurities in metals, and for other similar purposes.

Revere (re-vēr'), PAUL, born at Boston, Massachusetts, Jan. 1, 1735, has earned fame by riding through Charlestown to Concord on the night of April 18, 1775, to give warning of the British expedition, which was resisted next day at Lexington and Concord; a service immortalized in Longfellow's poem, The Midnight Ride of Paul Revere. He had been a goldsmith and copper-plate engraver, and subsequently he set up a foundry and erected works for rolling copper at Canton, Massachusetts, still carried on by his successors as the Revere Copper Company. He died May 10, 1818.

Reverend, a title of respect given to clergymen and other ecclesiastics. In England bishops are *right reverend*, archbishops *most reverend*, deans *very reverend*, and the lower clergy *reverend*. In Scotland the principals of the universities, if clergymen, are *very reverend*, and likewise the moderator of the General Assembly; all the other clergy are simply *reverend*.

Reverse, in numismatics, the side of a medal or coin opposite to that on which the head or principal figure is impressed. The latter is called the *obverse*.

Reversion, in law, the residue of an estate left in the granter, to commence in possession after the determination of the particular estate granted by him. The estate returns to the granter or his heirs after the grant is over. In insurance business a reversion is an annuity or other benefit, the enjoyment of which begins after a certain number of years, or after some specified event, as a death or birth.

Revet'ment (French, *revêtement*), in fortification, is a retaining wall placed against the sides of a rampart or ditch. In field-works it may be of turf, timber, hurdles, and the like; but in permanent works it is usually of stone or brick. The exterior faces of these walls are considered as the scarp and counterscarp of the ditch.

Review, an inspection of military or naval forces by an officer of high rank or by a distinguished personage, which may be accompanied with manœuvres and evolutions.

Reviews. See *Periodicals*.

Revise, among printers, a second or third proof of a sheet to be printed, taken off in order to be compared with the last proof, to see whether all the mistakes marked in it are actually corrected. See *Proof*.

Revising Barrister, in England, one of a number of barristers appointed annually for the purpose of examining or revising the list of parliamentary voters, and settling the question of their qualification to vote—duties performed in Scotland by the sheriff-substitute. The revising barristers' courts are held in the autumn.

Revival, a term applied to religious awakenings in the Christian church, and to the occurrence of extensive spiritual quickening and conversion in the general community. The first great revival in Europe was the Reformation in the 16th century, which awoke the church from the sleep of centuries. When religion had degenerated into formalism in England in the 17th century a second revival of spiritual interest was accomplished through the instrumentality of the Puritans. When the church had once more sank into a state of sloth and apathy in the 18th century, it was aroused by the preaching of Whitfield, the Wesleys, Rowland Hill, Venn, Newton, Cecil, Fletcher, and a multitude of other earnest men. Coincident with this movement was the origin of missions to the heathen. Scotland also presents several remarkable revivals. But it was reserved for recent times to witness in America and Great Britain perhaps the most remarkable religious revival which has been witnessed since the era of the Reformation. Movements of this nature, but of limited extent, have not been infrequent in the American churches, as in 1736 and 1830; but the great revival which originated in the United States in 1858 subsequently extended to the British Islands, and was experienced with more or less power throughout almost every part of the world. New York and Philadelphia were the principal centres of the movement, which became universal in the U. States, embracing all denominations and all classes of society. In the summer of 1859 the revival extended to the north of Ireland, chiefly through the agency of the Presbyterian Church, and from Ireland it spread to Scotland, where its power was extensively felt by the long-neglected population of the fishing villages in the east and north, and in Glasgow, Edinburgh, Aberdeen, Perth, Dundee, Paisley, Dumfries, and other large towns. Wales largely participated in this revival; the increase to the membership of its churches in one year, from June 1859, amounting to 100,000. Various parts of England also shared in the movement. The latest, and in some respects perhaps the most extraordinary revival movement of modern times, was that initiated by the two American 'evangelists,' D. L. Moody and Ira D. Sankey, whose respective functions it has been, to use their own words, 'to preach and to sing the gospel.' The movement commenced in 1873 in England, but it attained no great prominence until the arrival of the two evangelists in Edinburgh. Their ministrations in that city, and afterwards in Glasgow, Dundee, and other towns in Scotland, and also in England and Ireland, up to August 1875, were attended daily by multitudes of people, a remarkable feature of these assemblies being the presence in great numbers of the upper ranks of society, even to members of the peerage and royal family. On their return to the United States they headed a similar movement there; and they paid a second and equally successful visit to Britain in 1883–84. The Salvation Army, which was originated in 1865 and organized under its present name in 1878, may be regarded as a permanent revival organization. See *Salvation Army*.

Revival of Learning. See *Renaissance.*

Revocation, in law, the destroying or annulling of a deed or will which had existence till the act of revocation made it void. The revocation of a deed can only be effected when an express stipulation has been made in the deed itself reserving this power. The revocation of a will can be made in four different ways—(1) by another will; (2) by intentional burning, or the like; (3) by the disposition of the property by the testator in his lifetime; (4) by marriage.

Revolution, the more or less sudden, and it may be violent, overturning of a government or political system, with the substitution of something else. The term 'revolution' is applied distinctively in English history to the convulsion by which James II. was driven from the throne in 1688; and in French history to the upheaval of 1789. Subsequent French revolutions are those of 1830, 1848, 1851, and 1870–71. The American war of independence (1775–83) is often called a revolution.

Revolver, a description of firearm in which a number of charges contained in a revolving cylinder are, by pulling the trigger, brought successively into position and fired through a single barrel. For the introduction of the revolver in its present form we are indebted to Colonel Samuel Colt, of the United States, though repeating pistols had long been known in other countries. These were made from one mass of metal bored into the requisite number of barrels, but were so clumsy as to be almost quite useless. In Colt's weapon there is a revolving cylinder containing six chambers placed at the base of the barrel, each chamber having at its rear end a nipple for a cap, These contain the cartridges, which are put in from the front of the breech-piece and driven home by a lever ramrod placed in a socket beneath the barrel. The revolver is fired through the single barrel, the cylinder being turned by mechanism connected with the lock, until each chamber in succession is brought round so as to form virtually a continuation of the barrel. Various modifications of Colt's revolver have beenintroduced, with the view in some cases of increasing the rapidity and facility of firing, in others of diminishing by safeguards the risks to which inexperienced hands must ever be exposed in the use of these weapons. In the Smith and Wesson revolver, one of the most recent (adopted by Austria and Russia), facility in loading is a feature, the cylinder and barrel together being pivoted to the front of the stock, so that by setting the hammer at half-cock, raising a spring-catch, and lowering the muzzle, the bottom of the cylinder is turned up to receive fresh metallic cartridges. When this is done the muzzle is

Webley's Army Revolver, 'W G,' 1889.

pressed back until the snap-catch fastens it to the back plate, and the revolver is again ready to be fired. In the latest form of this revolver the spent cartridges are thrown out of the cylinder by means of an automatic discharger. The British regulation army revolver is Webley's modified Smith and Wesson, which chiefly differs from the original in the method of securing the hinged barrel and revolving chambers to the standing breech and stock of the pistol. The mode adopted permits of very rapid loading, and when fired off the empty cases are automatically ejected. The weapon can also be easily and instantly unloaded, and some are made with covered hammers, safety-bolts, and of small calibre for the pocket. As a military weapon the revolver will, it is thought, be superseded by a repeating pistol with mechanism similar to that of magazine rifles. The revolver principle has also been applied to rifles, and to guns for throwing small projectiles, as in the Gatling and other machine guns.

Revolving Furnace, a furnace with a rotary motion, used in some chemical manufactures and in the manufacture of malleable iron. The revolving furnace has superseded the reverbatory furnace in many processes.

Revolving Light. See *Lighthouse.*

Revue des Deux Mondes (rė-vü dā deu mond), a French journal, combining the features of an English magazine and review, and appearing twice a month. It was founded in 1829 by Ségur-Dupeyron and Mauroy, but its real foundation dates from 1831, when it came under the direction of M. François Buloz, under whose editorship it included among its contributors the most distinguished names in French literature.

Rewá, a native state in Central India, more or less under British control since 1812. Area, about 10,000 square miles; pop. (chiefly Hindus) 1,452,567. The state is rich in minerals and forest produce.—The town of Rewá lies 131 miles S.W. of Allahabad; it is surrounded by three ramparts, the innermost of which incloses the palace of the maharaja. Pop. 23,626.

Rewá Kántha, a political agency of India, subordinate to the government of Bombay. It was established in 1821–26, and has under its control 61 separate states, great and small, on the Nerbudda, most of which are tributary to the Gaekwar of Baroda. Area, 4980 square miles; pop. 733,506.

Rewári, a town in India, in Gurgaon district, Punjab, a place of considerable commercial importance, with manufactures of brass and pewter vessels and fine turbans, and a great trade in grain. Pop. 27,934.

Reyjkavik. See *Reikiavik.*

Reynard the Fox. See *Renard.*

Reynolds, Sir Joshua, English portrait-painter, was born at Plympton, Devonshire, 16th July, 1723, and was educated by his father, a clergyman and the master of the free grammar-school of that place. He studied his art for two years under Thomas Hudson, a Devonshire man then popular in London as a portrait-painter. Subsequently, through the kindness of Captain (afterwards Admiral) Keppel, he was enabled to visit Italy, where he studied three years. Returning to London in 1753, and finding generous patrons in Admiral Keppel and Lord Edgcumbe, his studio was thronged with the wealth and fashion of the metropolis, and the most famous men and the fairest women of the time were among his sitters, so that he rapidly acquired opulence, and was the acknowledged head of his profession. Among the more notable of his portraits are the Duchess of Hamilton (1758), the Duke of Cumberland (1759), Miss Palmer (1770), Mrs. Nesbitt as Circe (1781), Mrs. Siddons as the Tragic Muse (1784), the Duchess of Devonshire and Child (1786), and Miss Gwatkin as Simplicity (1788). In 1768, on the foundation of the Royal Academy, he was chosen president, and received the honour of knighthood; and in 1784 he was appointed principal portrait-painter to the king. As president of the Royal Academy he delivered his celebrated annual Discourses on Painting, the last of which was delivered in 1790. He was the intimate friend of Dr. Johnson, Goldsmith, Garrick, Burke, and other literary celebrities, with whom he was associated in founding the 'Literary Club' in 1764. His portraits are distinguished by dignity and grace, and above all by a peculiar power of colour which

Sir Joshua Reynolds.

he had caught in Italy from the great Venetian masters. Apart from portraiture the other pictures which may be mentioned are his Death of Cardinal Beaufort, Macbeth, Puck, and several Holy Families and Nativities. He died unmarried Feb. 23, 1792, and was interred in St. Paul's Cathedral.

Rhab'domancy (Greek *rhabdos,* a rod, and *manteia,* divination), divination by means of the divining-rod (which see).

Rhadaman'thus, in Greek mythology, a son of Zeus and Europa, and brother of Minos, king of Crete, whom he assisted in his sovereignty, and whose jealousy he aroused by his inflexible integrity, which earned for him the admiration of the Cretans. Rhadamanthus then fled to Bœotia, where he married Alcmene. After his death he became, on account of his supreme justice, one of the three judges of the lower world.

Rhæ'tia, a province of the Roman empire, which included great part of the Alpine regions between the valleys of the Danube and the Po, and corresponded with the districts occupied in modern times by the Austrian province of Tyrol and the Swiss canton of Grisons. The Rhætians, who are generally supposed to have been of Etruscan origin, were subdued by Drusus and Tiberius, 15 B.C.; and shortly afterwards Rhætia was incorporated as a province in the Roman

empire. During the last days of the Roman empire, when the barbarians devastated the provinces, Rhætia was nearly depopulated; and after the fall of the Roman empire it was occupied by the Alemanni and Suevi.

Rhætian Alps. See *Alps.*

Rhætic Beds, in geology, the uppermost strata of the triassic, or, according to others, the lowest of the liassic group; well represented in England and Germany, but most extensively developed in the Rhætian Alps, whence their name. They are more highly fossiliferous than any of the other members of the triassic period.

Rhamazan. See *Ramadan.*

Rhamna'ceæ, a natural order of exogenous plants, consisting of trees or shrubs, with simple, alternate, rarely opposite leaves, small greenish-yellow flowers, a valvate calyx, hooded petals, opposite to which their stamens are inserted, and a fruit which is either dry or fleshy. This order contains about 250 known species, distributed very generally over the globe. There is a remarkable agreement throughout the order between the properties of the inner bark and the fruit, especially in several species of *Rhamnus,* in which they are both purgative and emetic, and in some degree astringent. Many species, however, bear wholesome fruit; and the berries of most of them are used for dyes. (See *French Berries.*) The buck-thorn and jujube belong to this order.

Rhap'sodists (from the Greek *rhaptō,* to string together, and *ōdē,* a song) were the wandering minstrels among the ancient Greeks, who sang the poems of Homer (these were also called *Homeridæ*) and of other poets. After the poems were committed to writing the rhapsodists lost their importance.

Rhé. See *Ré.*

Rhea, in Greek mythology, the daughter of Uranos and Gē (Heaven and Earth), sister and wife of Cronos (Saturn), and mother of Hestia (Vesta), Dēmētēr (Ceres), Hera (Juno), Hades (Pluto), Poseidon (Neptune), and Zeus (Jupiter). She was the symbol of the reproductive power of nature, and received the appellation of 'Mother of the Gods,' and 'Great Mother,' being latterly identified with Cybele.

Rhea, same as *Ramie* or *Ramee* (which see).

Rhea, the generic name of the nandu or S. American ostrich, a close ally to the true ostrich, differing chiefly in having three-toed feet and each toe armed with a claw. The best-known species is *R. americana,* the *nandu,* or *nanduguaçu* of the Brazilians, inhabiting the great South American pampas. It is considerably smaller than the true ostrich, and its plumage is much inferior. *R. Darwinii,* a native of Patagonia, is still smaller. The third species is the *R. macrorhyncha,* so called from its long bill.

Rhegium. See *Reggio.*

Rheims, or REIMS (rēmz; French pron. rañz), a town of France, in the department of Marne, in an extensive basin surrounded by vine-clad hills, 82 miles E.N.E. of Paris. The principal edifices are the cathedral, erected in the 13th and 14th centuries, one of the finest Gothic structures now existing in Europe, specially remarkable for its western façade with three portals, rose-window, and numerous statues; the archiepiscopal palace (1498–1509), occupied by the French kings on the occasion of their coronation; the church of St. Remy (11th and 12th centuries), the oldest church in Rheims, partly Romanesque, partly Gothic; the Porte de Mars, a Roman triumphal arch erected in honour of Julius Cæsar and Augustus; the town-house, of the 17th century; and several ancient mansions, particularly the hôtel of the counts of Champagne, furnishing fine specimens of picturesque street architecture. The staple industries are the manufacture of the wine known as champagne, and of woollen fabrics, such as flannels, merinoes, blankets, &c. Rheims was an important place in the time of Cæsar, the capital of the Remi, and subsequently of Belgic Gaul. Here St. Remy converted and baptized Clovis and almost all the Frankish chiefs in 496. It was made the seat of an archbishop in the 8th century, and from the time of Philip Augustus (1179) to that of Charles X. the kings of France were crowned here. It has suffered much from war, and was at one time in possession of the English, who were expelled by the Maid of Orleans in 1429. It was held by the Germans in 1870–71. Since the Franco-German war it has been surrounded with detached forts, which render it a place of great strength. Pop. 107,017.

Rheingau (rīn'gou), a picturesque district of Prussia, district of Wiesbaden, on the right bank of the Rhine, between Biebrich and Rüdesheim, about 12 miles long by 5 broad, noted for its wines.

Rhenish Architecture, the style which Romanesque architecture assumed in the countries bordering upon the Rhine.

Rhenish Confederation. See *Confederation of the Rhine.*

Rhenish Prussia (German, *Rheinprovinz*), the most westerly province of Prussia, touching W. and N. Luxemburg, Belgium, and Holland; area, 10,420 square miles; greatest length from N. to S. about 200 miles, greatest breadth about 90. In the south it is hilly, being traversed by the ranges of the Eifel, Hochwald, &c. It is watered by the Rhine, the Moselle, and some affluents of the Meuse. A large proportion of the surface is in forest. Besides the usual cereal crops, tobacco, hops, flax, rape, hemp, and beet-root are raised; fruit culture and the vine culture are also carefully attended to. Cattle are extensively reared. It is the most important mineral district in Germany, abounding in coal, iron, lead, zinc, &c. It is likewise an active manufacturing district, there being numerous iron-works and machine-shops, textile factories, breweries, distilleries, &c. It is divided into the five governments or districts of Coblentz, Treves, Cologne, Aachen (Aix-la-Chapelle), and Düsseldorf. The city of Coblentz is the official capital of the province, but Cologne is the town of most importance. Pop. 5,106,079, the majority of whom are Roman Catholics.

Rhenish Wines, the general designation for the wines produced in the region watered by the Rhine, and specifically for those of the Rheingau, the white wines of which are the finest in the world. The red wines are not so much esteemed, being considered inferior to those of Bordeaux. Good wines are also produced in the valleys of the Neckar, Moselle, and other tributaries of the Rhine. The vineyards are mainly between Mannheim and Bonn, and the most valuable brands of wines are those of Johannisberg, Steinberg, Hochheim, Rüdesheim, Rauenthal, Markobrunn, and Assmannshausen, the last being a red wine.

Rhe'ostat, an instrument for measuring electrical resistances, invented by Sir Charles Wheatstone. The rheostat is very convenient for measuring small resistances; but for practical purposes, such as measuring the resistance of telegraph cables, Wheatstone's bridge (an apparatus of which there are several forms) is always used.

Rhesus Monkey, a name for two species of monkeys, the bruh or pig-tailed monkey (*Macăcus nemestrinus*), which inhabits the Malay Peninsula and the islands of the Indian Archipelago, and is often domesticated; and the *Macacus Rhesus*, a species of monkey held sacred in India, where they swarm in large numbers about the temples.

Rhet'oric, in its widest sense, may be regarded as the theory of eloquence, whether spoken or written, and treats of the general rules of prose style, in view of the end to be served by the composition. In a narrower sense rhetoric is the art of persuasive speaking, or the art of the orator, which teaches the composition and delivery of discourses intended to move the feelings or sway the will of others. In the wider sense rhetoric treats of prose composition in general, purity of style, structure of sentences, figures of speech, &c.; in short, of whatever relates to clearness, preciseness, elegance, and strength of expression. In the narrower sense it treats of the invention and disposition of the matter, the character of the style, the delivery or pronunciation, &c. Aristotle, Cicero, and Quintilian are the principal writers on rhetoric among the ancients; and among the English Campbell, Blair, Whately, Spalding, and Bain.

Rheumatism, an ailment or set of ailments attended with sharp pains, partly neuralgic in character, and partly owing perhaps to infection with certain disease germs. Some varieties of it have so much resemblance to the gout that some physicians have considered it as not an entirely distinct disease. Rheumatism is distinguished into *acute* and *chronic*. The former is characterized by fever more or less severe, pains in the joints, which are swollen, red, and tender, and sweating. The inflammation flits from one joint to another, one joint getting well when another is attacked; and the pain may be very severe. The entire duration of an attack, if not treated, may be from two to six or ten weeks, and disease of the heart may be a consequence of this disease. Chronic rheumatism is distinguished by pain and stiffness, either stationary or shifting, in the joints, without fever. It is aggravated by damp weather, and usually is never absolutely got rid of. Acute rheumatism mostly terminates in one of these species. Rheumatism may arise at all times of the year, when there are frequent vicissitudes of the weather from heat to cold, but the spring and autumn are the seasons in which it is most prevalent; and it attacks persons of all ages, but very young people are less subject to it than adults. Obstructed perspiration, occasioned either by wearing wet clothes, lying in damp sheets or damp rooms, or by being exposed to cool

air when the body has been much heated by exercise, is the cause which usually produces rheumatism.

Rheydt (rīt), a town of Rhenish Prussia, on the Niers, 14 miles W. of Düsseldorf, has manufactures of cotton, silk, woollen, and mixed fabrics. Rheydt is an ancient place, which has risen to industrial importance during the present century. Pop. 30,099.

Rhigas, CONSTANTINE, Greek poet, the Tyrtæus of modern Greece, the first mover of the war for Grecian independence, was born about 1753. He formed the bold plan of freeing Greece from the Porte by means of a great secret association, and composed in his native language a number of patriotic songs, calculated to inflame the imagination of the Greek youth and to embitter them against the Mussulmans. He was arrested and put to death by the Turkish authorities at Belgrade in May 1798. During the Greek war of independence, which ultimately led to the emancipation of their country from the Turkish yoke, his songs were in the mouth of every one.

Rhin (BAS-) and **Rhin** (HAUT-), that is Lower and Upper Rhine, former departments of France, on the east of the Rhine, now forming part of the German imperial territory of Alsace-Lorraine, and corresponding pretty closely with the governments of Lower and Upper Alsace.

Rhinan'thus, a genus of annual herbs, natural order Scrophulariaceæ, with opposite serrate leaves and nodding spikes of yellow flowers. The species are confined to the northern hemisphere, and are parasitic on the roots of plants. Two of them are British and are known by the name of *yellow-rattle*.

Rhine (German, *Rhein;* Dutch, *Rijn*), the finest river of Germany, and one of the most important rivers of Europe, its direct course being 460 miles and its indirect course 800 miles (about 250 miles of its course being in Switzerland, 450 in Germany, and 100 in Holland); while the area of its basin is 75,000 square miles. It is formed in the Swiss canton Grisons by two main streams called the Vorder and Hinter Rhein. The Vorder Rhein rises in the Lake of Toma, on the S.E. slope of the St. Gothard, at a height of 7690 feet above the sea, near the source of the Rhone, and at Reichenau unites with the Hinter Rhein, which issues from the Rheinwald Glacier, 7270 feet above sea-level. Beyond Reichenau, which is 7 miles west of Coire, the united streams take the common name of Rhine. From Coire the Rhine flows north through the Lake of Constance to the town of that name, between which and Bâle it flows west, forming the boundary between Switzerland and Germany. At Bâle it turns once more to the north and enters Germany; and, generally speaking, it pursues a northerly course until it enters Holland, below Emmerich, when it divides into a number of separate branches, forming a great delta, and falling into the sea by many mouths. The chief of these branches are the Waal and Lek, which unite with the Maas; the Yssel and Vecht, which diverge to the Zuyder Zee; and that which retains the name of Rhine, a small stream that passes Leyden and enters the North Sea. In the German part of its course the chief tributaries it receives on the left are the Ill, Nahe, Moselle (with the Saar), Ahr, and Erft; and on the right the Neckar, Main, Lahn, Sieg, Ruhr, and Lippe. In Switzerland its tributaries are short and unimportant, and this part of its course is marked by the Falls of the Rhine at Schaffhausen, where the river is precipitated in three leaps over a ledge of rocks 48 to 60 feet in height, and by the cataracts of Lauterberg and the rapids of Rheinfelden. The chief towns on its banks are Constance and Bâle in Switzerland; Spires, Mannheim, Mainz, Coblentz, Bonn, Cologne, and Düsseldorf, with Worms and Strasburg not far distant, in Germany; Arnheim, Utrecht, and Leyden, in Holland. Its breadth at Bâle is 750 feet; between Strasburg and Spires from 1000 to 1200 feet; at Mainz 1500 to 1700 feet; and at Emmerich, where it enters the Netherlands, 2150 feet. Its depth varies from 5 to 28 feet, and at Düsseldorf amounts even to 50 feet. It abounds with fish, especially pike, carp, and other white fish, but the produce of its salmon fisheries have been seriously interfered with since the introduction of steam vessels. It is navigable without interruption from Bâle to its mouth, a distance of 550 miles, and much timber in rafts, coal, iron, and agricultural produce are conveyed by it. Large sums are spent every year in keeping the channel in order, and in the erection or repair of river harbours, both in Germany and Holland. The shipping has greatly increased since the introduction of steam vessels, which also ply on the Main, the Neckar, the Maas, and the Moselle. The Rhine anciently formed the boundary between the Roman Empire

and the Teutonic hordes. After the partition of the domains of Charlemagne in 843 it lay within the German empire for nearly 800 years. France long cast covetous eyes upon the Rhine, and the Peace of Westphalia in 1648 gave her a footing upon the left bank. In 1801 the whole of the left bank of the Rhine was formally ceded to France. The Congress of Vienna in 1815 restored part of the Rhenish valley to Germany, and the cession by France of Alsace and Lorraine after the war of 1870–71 made the Rhine once more German. The Rhine is distinguished by the beauty of its scenery, which attracts many tourists. For a large part of its course it has hills on both sides at less or greater distances. Pleasant towns and villages lie nestled at the foot; above them rise rocky steeps and slopes clothed at one time with vines, at others with natural wood, and every now and then the castles and fastnesses of feudal times are seen frowning from precipices apparently inaccessible. The finest part for scenery is between Bingen and Bonn; after entering Holland the views are generally tame and uninteresting.

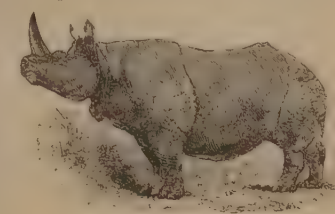
Rhine, Confederation of. See *Confederation of the Rhine.*

Rhine-Province. See *Rhenish Prussia.*

Rhine Wine. See *Rhenish Wines.*

Rhinobat'idæ, the shark-rays or beaked rays, a family of fishes, of which the sawfish is the most remarkable member. See *Saw-fish.*

Rhinoceros, a genus of hoofed mammals, belonging to the perissodactylate or odd-toed division, allied to the elephant, hippopotamus, tapir, &c. They are large ungainly animals, having short legs, and a very thick skin, which is usually thrown into deep folds. There are seven molars on each side of each jaw; there are no canines, but there are usually incisor teeth in both jaws. The feet are furnished with three toes each, encased in hoofs. The nasal bones usually support one or two horns, which are of the nature of epidermic growths, somewhat analogous to hairs. When two horns are present the one is placed behind the other and is generally shorter than it. These animals live in marshy places, and subsist chiefly on grasses and foliage. They are exclusively confined to the warmer parts of the eastern hemisphere. The most familiar species is the one-horned or Indian rhinoceros (*Rhinoceros unicornis* or *indicus*), which, like all the Asiatic species, has the skin thrown into very definite folds, corresponding to the regions of the body. The horn is black, and usually very thick. The upper lip is very large, and is employed by the animal somewhat as the elephant uses his trunk. Though possessed of great strength it is quiet and inoffensive unless provoked.



Indian Rhinoceros (*Rhinoceros indicus*).

The Javanese rhinoceros (*R. sondaicus*) is distinguished from the Indian chiefly by its smaller size. It has been trained to bear a saddle and to be driven. It occurs in Java, Sumatra, and Borneo. The Sumatran species (*R. sumatrensis*) is found in Sumatra and the Malay Peninsula. It has two horns, the first being the longer and sharper. The typical African rhinoceros (*R. bicornis*), is found in Southern Africa generally. Like other African species it possesses no skin-folds. The horns are of very characteristic conformation, the front horn being broad and raised as on a base, sharp-pointed, and curved slightly backwards, whilst the hinder horn is short and conical. This animal appears to be of ferocious disposition, is quick and active, and greatly feared by the natives. Other allied African species are the Keitloa or Sloan's rhinoceros (*R. Keitloa*), the common white rhinoceros (*R.* or *Ceratotherium Simus*), and the *Kobaoba* or long-horned white rhinoceros (*R.* or *C. Oswelli*). Fossil species are numerous, and range from the Miocene tertiary through the Pliocene and Post-pliocene deposits. *R. tichorhinus,* the 'woolly rhinoceros,' formerly inhabited England and ranged over the greater part of Europe.

Rhinoceros-bird, or Rhinoceros-horn-bill. See *Hornbill.*

Rhinoloph'idæ, a family of insectivorous bats, including the greater and lesser horse-shoe bats of Great Britain. See *Bat.*

Rhinoplastic Operation, the surgical operation of restoring the nose when partly lost by disease or injury (early practised in

India by the Brahmans), by means of a triangular piece of skin cut from the forehead, and drawn down to its new position while still attached to the face by the lower angle; or the piece of skin may belong to the arm. The extreme joint of a finger has been used to support such an artificial nose. It is popularly known as the *Taliacotian operation*, from the name of the Italian surgeon who in the 16th century first made it public.

Rhio, or RIOUW (ri-ou'), a seaport belonging to the Dutch, in the Indian Archipelago, on an islet 50 miles south-east of Singapore. It consists of a European town, and a Chinese or native town, and having a capacious haven where large vessels find anchorage, carries on a considerable trade. It is the capital of a Dutch residency, comprising the islands of the Rhio Archipelago and other groups as well as districts on the east coast of Sumatra. The population of the residency is estimated at 90,000. The Rhio Archipelago is a group of small islands lying chiefly south and east of Singapore. Chief island Bintang.

Rhizan'theæ, or RHIZ'OGENS, a remarkable group of plants, considered by Lindley as forming a separate class, which he places in a position intermediate between the Thallogens and the Endogens. It consists of plants destitute of true leaves, but with short amorphous stems parasitical on roots, and is divided by Lindley into the three orders Balanophoraceæ, Cytinaceæ, and Rafflesiaceæ. By other botanists these orders are placed widely apart.

Rhizobola'ceæ, the suwarro-nut order of plants, of which only a few species are known, consisting of large exogenous trees growing in the forests of South America. One of them (*Caryocar butyrōsum*), a gigantic tree of Demerara, yields the suwarro, or souari nut, the kernel of which is esteemed as the most agreeable of the nut kind. The timber is used in ship-building.

Rhizoma'nia, in botany, an abnormal development of some plants, as the vine and laurel, by which they throw out adventitious roots, indicating that there is something wrong with the proper root.

Rhiz'ome, or ROOT-STOCK, in botany, a sort of stem running along the surface of the ground, or partially subterranean, sending forth shoots at its upper end and decaying at the other. It occurs in the ferns, iris, &c.; and in the ferns it may be wholly covered with the soil.

Rhizoph'aga, roots-eaters; one of the sections of the marsupials (which see).

Rhizoph'ora, the mangrove genus of plants. See *Mangrove*.

Rhizop'oda, the lowest class of the Protozoa, comprehending animals which are destitute of a mouth, are single or compound, and possess the power of emitting pseudopodia. They are mostly minute, frequently microscopic, but some (such as the sponges) attain considerable size. Structurally the rhizopods consist of a mass of sarcode, destitute of organs for digestion, &c. The characteristic from which they have their name is their capability of protruding processes (pseudopodia) from any part of their substance, sometimes as filaments or threads and sometimes fingershaped, and retracting them at pleasure. Some, as the Foraminifera, are invested with a calcareous shell, sometimes consisting of one cell, but generally of an aggregation of minute chambers or cells, through the pores of which they protrude their fibrelike processes. The class has been divided into five orders—Monera, Amœbea, Foraminifera, Radiolaria, and Spongida, of which the last is occasionally considered a separate class. See separate entries.

Rhode Island, the smallest of the United States of North America, between Massachusetts, Connecticut, and the Atlantic; area, 1250 square miles. The surface, which in the north is hilly and rugged, but elsewhere generally level, is divided into two parts by Narragansett Bay, a fine body of water about 30 miles long by 15 miles broad, and containing several islands, and among others the one which gives the state its name. The chief rivers are the Pawtucket, the Pawtuxet, and the Pawcatuck. The climate is mild and equable, and well adapted, from its pleasant summers and temperate winters, for invalids from the south. The minerals include coal, iron ore, and limestone; sandstone, marble, and serpentine are sufficiently common. The soil is only of indifferent fertility. Manufactures form the staple industry; they consist of cotton, woollen, worsted, and mixed textiles, jewelry, and foundry and machine-shop products. The chief religious denominations are the Baptists, Congregationalists, Episcopalians, and Methodists, the Baptists having the largest membership. The higher education is provided for by Brown University at Providence. A compulsory education law is now in force for children from 7 to 14 for

twelve weeks in the year only. The chief cities are Providence (pop. 132,146), Pawtucket, and Newport. Providence and Newport both rank as state capitals. Rhode Island is one of the six New England states, and one of the original thirteen which formed the Union. It was first settled in 1636 by a small colony headed by Roger Williams, who had been banished from Massachusetts for his religious opinions. Pop. 345,506.

Rhodes (rōdz), a Turkish island in the Ægean Sea, off the south-west coast of Asia Minor, separated from it by a channel 10 miles broad; area, 560 sq. miles. It is traversed by a mountain range, the highest point of which is 4786 feet. Great part of the island is occupied by hills of more moderate elevation, which are covered with woods of ancient pines. The climate is delightful, and the soil fertile, producing grain, grapes, figs, pomegranates, oranges, &c. Steam navigation direct to the island has been established, and commerce is increasing. Pop. 30,000, of whom 20,000 are Greeks, 7000 Turks, and 1500 Jews. Rhodes was a celebrated island in antiquity. It was settled by Dorians from Greece, and the Rhodians soon became an important maritime people, and for several centuries the island was a great seat of literature, art, and commerce. In A.D. 44 it was made part of the Roman province of Asia. It is famous for its prolonged defence by the Knights of St. John from 1309 till 1522, when they were forced to abandon the island to the Turks, with whom it has remained ever since.—RHODES, the capital, stands at the north-eastern extremity of the island, rising from the sea in the form of an amphitheatre, with fortifications mainly the work of the Knights of St. John. There are few remains of the ancient city, which was founded by the Dorians 408 B.C., one of the most splendid of ancient Greek cities. The celebrated Colossus of Rhodes stood for fifty-six years, and was prostrated by an earthquake 224 B.C. (See *Colossus.*) Pop. about 11,000.

Rhodes, CECIL, born in England in 1853, went out to S. Africa early in life, and becoming connected with the Kimberley diamond mines accumulated a large fortune. Having entered the Cape parliament, he became colonial prime-minister in 1890, and held this position till 1896, when his alleged connection with the Jameson raid caused him to resign. He has been the leading spirit in the British South Africa Company, and it is mainly by his influence that the vast regions administered by the company have been added to the British Empire. He became a member of the Privy Council in 1895.

Rhode'sia, a name popularly given to the territories of the British S. Africa Company, stretching northwards from the Transvaal across the Zambesi to the Congo Free State. See MASHONALAND, MATABELELAND, &c.

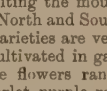
Rhodez. See *Rodez.*

Rho'dium, a metal belonging to the platinum group, discovered by Wollaston in 1804. It is of grayish-white colour, very ductile and malleable, hard and very infusible, unaltered in the air at ordinary temperatures, but oxidizes at a red heat. It has been used for the points of metallic pens.

Rhodium Oil, a balsamic volatile oil obtained from Canary Island rosewood, the woody root of *Convolvulus scoparius* and *floridus.* It is employed as a perfume, but there is also an artificial perfume so called.

Rhododen'dron, a genus of evergreen shrubs with alternate, entire leaves, and ornamental flowers disposed in corymbs, belonging to a sub-order of the Ericaceæ (heaths), and chiefly inhabiting the mountainous regions in Europe, North and South America, and Asia. The varieties are very numerous, and are much cultivated in gardens. The colours of the flowers range through rose, pink, lilac, scarlet, purple, red, and white. *R. chrysanthum,* a Siberian species, possesses narcotic properties; *R. ferrugineum,* found in Switzerland, is called the rose of the Alps. *R. Dalhousiæ* is an epiphytic species. *R. nivale,* on the Tibetan mountains, is found at elevations of 16,000 to 18,000 feet. In Kumaon *R. arboreum* grows to a height of 40 feet.

Rhodope (rō'do-pē), the ancient name of a range of mountains belonging to the Balkan system, partly in and partly south of Eastern Roumelia.



Rhombus, in geometry, a quadrilateral figure whose sides are equal and the opposite sides parallel, but whose angles are unequal, two being acute and two obtuse.

Rhondda, a river in Glamorganshire, South Wales, which flows 14 miles S.E. to join the Taff at Pontypridd. The Rhondda parliamentary division consists of the township of Ystradyfodwg (which see).

Rhone (rōn; Latin, *Rhodănus*), a river which rises in Switzerland, in the east of canton Valais, taking its origin in the Rhone Glacier, 5581 feet above the sea-level.

It passes through the Lake of Geneva, and enters France, flowing first southwards and then westwards to the city of Lyons, where it turns almost due south, and so continues till (after passing Avignon and Arles) it falls into the Gulf of Lyons by a greater and a smaller mouth, forming here an extensive delta. (See *Camargue.*) Its principal affluent is the Saône, which enters it at the city of Lyons; other large tributaries are the Isère and Durance. Its whole course is about 500 miles; its drainage area is 38,000 miles; and it is navigable for 360 miles. The great obstacles to its navigation are the rapidity of its current, the shifting character of its channel, and the variations that take place in the volume of its water; but these obstacles have to a great extent been removed by a recent scheme of regularization and canalization, intended to secure everywhere a depth of over 5 feet. By means of a series of magnificent canals the navigation of the Rhône has been continued, without interruption, to the Rhine (through the Saône), Seine, and Loire, and to the Meuse and the Belgian system.

Rhône, a department in France, in the basin of the Rhône, to which it sends its waters by the Saône (with the Azergues) and the Gier; area, 1077 square miles. The soil is only moderately fertile, and the wealth of the department is derived from its manufactures, the chief of which is silk; others being cottons and woollens, linens, machinery, and metal goods. The city of Lyons is the capital. Pop. 806,737.

Rhône, Bouches du. See *Bouches-du-Rhône.*

Rhubarb (*Rheum*), a genus of plants belonging to the natural order Polygonaceæ. The species of this genus are large-leaved herbaceous plants, natives of a considerable portion of Central Asia, with strong branching, almost fleshy roots and erect branching stems 6 to 8 feet high. They usually possess more or less purgative and astringent properties; this is essentially the case with their roots, and hence these are largely used in medicine. The principal kinds of medicinal rhubarb have received such names as Russian or Turkey, East Indian, Himalayan, Chinese, and English, according to their source or the route by which they have reached Europe. At present most of the Asiatic rhubarb comes from China, the plant yielding it being mostly *R. officinăle.* English rhubarb is derived from *R. Rhapontĭcum*, which has long been cultivated for medical purposes in some parts of England as well as on the European continent. The leaf-stalks of this species, as well as of *R. undulātum* and others, are now largely used for tarts, puddings, jam, &c., and the juice is made into a kind of wine.

Rhuddlan, or Rhyddlan (ruth'lân, hrith'-lân), a parliamentary borough and port, North Wales, in Flintshire, on the Clwyd, one of the Flint district of boroughs. Pop. 1230.

Rhumb-line. See *Loxodromic Curve.*

Rhumbs, the points of the compass. See *Compass.*

Rhus. See *Sumach.*

Rhyl (ril), a watering-place of North Wales, in Flintshire, near the mouth of the Clwyd. It has pure air and a fine sandy beach, with all the equipments of a watering-place, and possesses the charm of a most interesting country at the back. Pop. 6491.

Rhyme, more correctly Rime (A. Saxon, *rîm*, number), in poetry, a correspondence in sound of the terminating word or syllable of one line of poetry with the terminating word or syllable of another. To constitute this correspondence in single words or in syllables it is necessary that the vowel and the *final* consonantal sound (if any) should be the same, or have nearly the same sound, the initial consonants being different. English writers have allowed themselves certain licenses, and we find in the best English poets rhymes which strike an accurate ear as incorrect, such as *sky* and *liberty*, *hand* and *command*, *gone* and *alone.* Such rhymes may be tolerated if they only occur at rare intervals, but they must certainly be regarded as blemishes. If the rhyme is only in the last syllables, as in *forgave* and *behave*, it is called a *single* rhyme; if in the two last syllables, as *bitter* and *glitter*, it is called a *double* rhyme; if in the last three syllables, as *callosity* and *reciprocity*, it is called a *triple* rhyme. This last sort of rhymes is principally used in pieces of a comic or conversational character. Rhymes which extend to more than three syllables are almost confined to the Arabians and Persians in their short odes (*gazelles*), in which the same rhyme, carried through the whole poem, extends sometimes to four and more syllables. The modern use of rhyme was not known to the Greeks and Romans; though some rhymed verses occur in Ovid. It has been used, on the other hand, from time immemorial among the Chinese, Hindus, Arabs, and other oriental nations. Rhyme

began to be developed among western nations in the Latin poetry of the Christian church. It is found used as early as the 4th century. The early English, German, and Scandinavian poems are distinguished by alliteration instead of rhyme. (See *Alliteration.*) The Troubadours first attempted a variety of artificial combinations of rhyme in the sonnet, canzone, &c., and the Spaniards and Italians, with their musical languages and delicacy of ear perfected the forms of involved rhyme.

Rhymer, THOMAS, of Erceldoune, or Earlston, in Berwickshire, otherwise called THOMAS THE RHYMER, was a half-legendary Scottish poet or romancer of the 13th century. He is mentioned by Barbour, Blind Harry, and Wyntoun, was credited with prophetical powers, and his Prophecies, a collection of oracular rhymes, were long popular in Scottish folk-lore. The old metrical romance of Sir Tristram is doubtfully ascribed to him.

Rhymney (rim'ni), a town in South Wales, chiefly in Monmouthshire, partly in Brecknock, on the river Rhymney, 22 miles N. of Cardiff, has large iron and steel works, including blast-furnaces and rolling-mills. Pop. 7733.

Rhynchonella (rin-ko-nel'la), a genus of brachiopodous molluscs. As many as 250 fossil species are numbered from the lower Silurian upward, but only two or three living species are known, inhabiting the deeper parts of the Arctic and Antarctic Oceans.

Rhynchops (rin'kops). See *Skimmer.*

Rhythm, in general, means a measured succession of divisions or intervals in written composition, music, or dancing. The rhythm of poetry is the regular succession of accent, emphasis, or voice-stress; or a certain succession of long and short (heavy and light) syllables in a verse. Prose also has its rhythm, and the only difference (so far as sound is concerned) between verse and prose is, that the former consists of a regular succession of similar cadences, or of a limited variety of cadences, divided by grammatical pauses and emphases into proportional clauses, so as to present sensible responses to the ear at regular proportioned distances. In music, rhythm is the disposition of the notes of a composition in respect of time and measure; the measured beat which marks the character and expression of the music.

Rhyti'na, a genus of mammalia, closely allied to the manatee and dugong, which has become extinct within the last century or so. The only known species of Rhytina (*Rhytina Stelleri*) was discovered in 1741 by the Russian naturalist Steller on an island in Behring's Straits, on which he and a party of sailors had been shipwrecked. The animals were fish-like in shape, and of great size—specimens measuring 25 feet in length and 20 feet in greatest circumference. The head was small. The tail-fin was crescentic in form, and front limbs only were developed.

Rial'to. See *Venice.*

Riazan, or RYAZAN (ryä-zän'), capital of a government of the same name in Central Russia. The town is situated on the Trubesh, a tributary of the Oka, in the centre of a rich agricultural district, and has a large trade, more especially in rye. Manufactures include woollens, linens, needles, and leather. Pop. 30,375.—The government has an area of 16,254 square miles, and is wholly drained by the Oka and its tributaries. The surface on the right of the Oka is largely swampy and has extensive forests; on the left it is generally fertile. Cereals of all kinds are produced for export. The principal manufactures are cotton, linen, leather, and spirits. Pop. 1,783,958.

Rib, the name given to the curved bones which in man and the other vertebrates spring from either side of the spine or vertebral column, and which may or may not be joined to a sternum or breast-bone in front. The ribs ordinarily agree in number with the vertebræ of the back or dorsal region. Thus in man twelve dorsal vertebræ and twelve pairs of ribs exist. The *true* or sternal ribs are the first seven, which are articulated at one extremity to the spine, and at the other to the sternum by means of cartilages. The *false* or short ribs are the remaining five; the uppermost three being united by their cartilages to the cartilage of the last *true* rib. The others are free at their sternal extremity, and hence have been called 'floating ribs.' Ribs are wanting in such lower fishes as lampreys, lancelets, &c., and in amphibians such as frogs and toads. The number of these bones may be very great in certain species, and they are occasionally developed in the cervical and pelvic regions in reptiles and birds respectively.

Rib, in architecture, a term applied variously, as for instance to an arch-formed piece of timber for supporting the lath and plaster work of a roof; a plain or ornamented moulding on the interior of a vaulted roof; to the mouldings of timber roofs, and those forming tracery on walls and in windows.

Ribble, a river of Yorkshire and Lancashire, rises at Wharnside Mountain, and flows generally S. and S.W. till it expands below Preston into an estuary of the Irish Sea. Since 1885 vast river diversion works, and the construction of a dock at Preston, have been going on, which, when completed, will greatly improve the navigation of the river.

Ribbon, a narrow web, generally of silk, used for tying and ornamental purposes. Ribbon-weaving is a special branch of the textile industries. In modern looms as many as forty ribbons are simultaneously woven in one machine. Ribbon-weaving was established near St. Etienne in France in the 11th century. In England Coventry is an important seat of this industry, which is also carried on at Norwich and Leicester. Mixed fabrics of silk and cotton are now largely employed. The terms *blue ribbon* and *red ribbon* are often used to designate the orders of the Garter and Bath respectively, the badge of the former being supported by a blue ribbon, and that of the latter by a red ribbon.

Ribbon-fishes, the name of certain deep-sea fishes met with in all parts of the ocean, generally found floating dead on the surface, or thrown ashore by the waves. The body is like a band from 15 to 20 feet long, 10 to 12 inches broad, and an inch or two thick. These fishes are generally silvery in colour. They live at such a depth that when they reach the surface the expansion of gases in the body so loosens all parts of the muscular and bony system that some portions are nearly always broken on lifting them out of the water. The fin rays in young ribbon-fishes are extraordinarily developed, some of them being several times longer than the body. The deal-fish (*Trachypterus arcturus*) is often met with in the N. Atlantic, and is sometimes found after gales on the Scottish coasts. See *Deal-fish*, *Oar-fish*.

Ribbon-grass, CANARY-GRASS, a garden variety, striped with green and white, of *Phalaris arundinacea*, a grass which is found in its wild state by the sides of rivers. Called also *gardener's garters*.

Ribbonmen, the members of a secret society organized among the Roman Catholics in Ireland about the beginning of the present century in opposition to that of the Orangemen. It originated in Armagh, and spread thence to Down, Antrim, Tyrone, and Fermanagh. The organization of the society was similar to that of the Orangemen, but by no means so complete. The membership from the first was drawn almost exclusively from the lowest classes of the population.

Ribbon-worms, a group of annuloid animals belonging to the sub-order Nemertida, a division of the order Turbellaria of the Platyelmia or 'Flat-worms.' The leading characteristics of ribbon-worms are an elongated worm-like body, an alimentary canal terminating in a distinct anus, and a protrusible proboscis. These forms are marine in habits, and are not parasitic. The sexes are generally separate, and reproduction may be subserved by ova, by gemmation or budding, or by division of the body substance.

Ribe (rē'be), or RIPEN, a town of Denmark, in the south-west of Jutland, on the Ribe, about 3 miles from its mouth. It has a cathedral of the 12th century, and was once a flourishing port. Pop. 3933.

Ribeauville (ri-bō-vēl). Same as *Rappoltsweiler*.

Ribe'ra, GIUSEPPE. See *Spagnoletto*.

Ribes, a genus of plants of the natural order Grossulariaceæ, comprehending the gooseberry and the currants. A species with scarlet flowers (*R. sanguineum*), and a variety of this with white flowers, are much cultivated as ornamental shrubs.

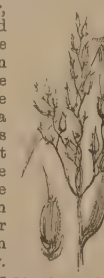
Ribston-pippin, a fine variety of apple, so called from *Ribston*, in Yorkshire, where it was raised from pips obtained from Rouen in Normandy.

Ricar'do, DAVID, a celebrated writer on finance and political economy, was the son of a Jewish stockbroker, and was born in London in 1772, died 1823. In 1793 he embraced Christianity and married a Christian wife. He then began business as a stockbroker on his own account, and in a short time realized an immense fortune. His first publication was on the subject of the depreciation of the national currency (1810). He then published an Essay on Rent, and his name is usually associated with a certain distinctive view on this subject. (See *Rent*.) In 1816 he wrote a pamphlet entitled Proposals for an Economical and Secure Currency. But his most important work is his Treatise on Political Economy and Taxation, which appeared in 1817. In 1819 he entered parliament as member for Portarlington. In 1822 he published a pamphlet on Protection to Agriculture. Though his mode of treatment is totally different, he belongs essentially to the school of Adam Smith.

Ricciarelli (rit-chà-rel'lē), DANIELE, better known by the name of DANIELE DA VOLTERRA, Italian painter, born at Volterra in 1509. He studied painting at Siena, and afterwards repaired to Rome, where he was much indebted to the friendship of Michael Angelo, who not only instructed him, but gave him designs for some of his most celebrated works. His fame rests chiefly on a series of frescoes in the church of La Trinità de' Monti, Rome; and of these the Descent from the Cross is well known by Toschi's admirable engraving. Ricciarelli was employed by Paul IV. to partially drape the nude figures in Michael Angelo's Last Judgment in the Sistine Chapel of the Vatican. By this act he earned for himself the soubriquet of Il Braghettone (The Breeches-maker). In the latter part of his life Ricciarelli applied himself also to sculpture. He died at Rome in 1566 or 1567.

Riccio. See *Rizzio*.

Rice (*Orȳza sativa*), a cereal plant, natural order Graminaceæ or Grasses. This important food-plant was long known in the East before it was introduced into Egypt and Greece. It is now cultivated extensively in the low grounds of the tropical and sub-tropical parts of south-eastern Asia, Egypt, Japan, part of the United States, and in several districts of southern Europe. The culm of the rice is from 1 to 6 feet high, annual, erect, simple, round, and jointed; the leaves are large, firm, and pointed, arising from very long, cylindrical, and finely striated sheaths; the flowers are disposed in a panicle somewhat resembling that of the oat; the seeds are white and oblong, but vary in size and form in the numerous varieties. In the cultivation of this plant a high summer temperature is required, combined with abundance of water. Thus the sea-board areas and river deltas which are subject to inundation give the best conditions, otherwise irrigation is necessary. The amount of water required by the plant depends upon its strength and stage of growth. In Egypt it is sown whilst the waters of the Nile cover the land, and the rice plant grows luxuriant in the rich alluvial deposit left by the receding flood. The Chinese obtain two crops a year from the same ground, and cultivate it annually on the same soil, and without any other manure than the mud deposited by the water of the river used in overflowing it. The young plants are transplanted into ploughed furrows, and water is brought over them and kept on till the plants begin to ripen. The first crop is cut in May, and a second is immediately prepared for by burning the stubble, and this second crop ripens in October or November. In India two harvests are obtained in the year, especially in Bengal, and frequently two crops are taken from the same field. In Japan, Ceylon, and Java rice is cultivated much in the same manner. Mountain rice is a hardy variety which thrives on dry soil; and in India it is cultivated at an altitude of 8000 feet. Rice can be profitably cultivated only in warm countries, but has for some time past been grown in South Germany and Italy. In the United States it is grown chiefly in the swampy districts of South Carolina, Georgia, and Louisiania. In the husk rice is known by the name of 'paddy.' Rice is more largely consumed by the inhabitants of the world than any other grain; but it contains less flesh-forming matter (nitrogenous), this essential element being, in 100 parts of rice, only 6·5. At one period Europe was supplied from America, but this source has almost been entirely superseded by Lower Burmah, India, Siam, Japan, and Cochin-China. The inhabitants of the East obtain from rice a vinous liquor more intoxicating than wine; and *arack* is also made from it. See *Arack*.



Rice (*Orȳza sativa*).

Rice, INDIAN. See *Canada Rice*.

Rice-bunting, a name given to two distinct birds. The first, also known by the name 'bob-o'-link,' is the *Emberiza oryzivŏra* (or *Dolichonyx oryzivŏrus*), a bird of the bunting family, which migrates over N. America from Labrador to Mexico, appearing in Massachusetts about the begin-

Rice-bunting (*Orysornis oryzivŏra*).

ning of May. Their food is insects, worms, and seeds, including rice in S. Carolina. The song of the male is singular and pleasant. When fat their flesh becomes little inferior in flavour to that of the European ortolan. The other species, known as the rice-bunting, is the *Oryzornis oryzivŏra*, also known as the Java sparrow and paddy bird. It belongs to the true finches, a group nearly allied to the buntings. It possesses a largely-developed bill; the head and tail are black, the belly rosy, the cheeks of the male white, and the legs flesh-coloured. It is dreaded in Southern Asia on account of the ravages it commits in the rice-fields. It is frequently brought to Europe, and is found in aviaries.

Rice-paper, a substance prepared from thin, uniform slices of the snow-white pith of *Aralia papyrifera* which grows in Formosa. Rice-paper is prepared in China, and is used in the manufacture of artificial flowers and by native artists for water-colour drawings.

Rich, EDMUND, English ecclesiastic, born at Abingdon about 1195. He studied theology at Paris, afterwards taught the Aristotelian logic and scholastic philosophy in Oxford, and was prebendary and treasurer of Salisbury Cathedral 1219–22. He preached the sixth crusade in 1227, became archbishop of Canterbury in 1233, and exhibited great energy as a reformer. His authority was superseded by that of the legate, Cardinal Otho, and being unable to obtain redress at Rome he retired to France in 1240 and died in 1242. He was canonized in 1249.

Richard I., King of England, surnamed Cœur de Lion, second son of Henry II. by Eleanor of Aquitaine, was born at Oxford in 1157. He several times rebelled against his father, and in 1189, supported by the King of France, he defeated the forces of Henry, who was compelled to acknowledge Richard as his heir. On Henry's death at Chinon, Richard sailed to England and was crowned at Westminster (September 1189). The principal events of his reign are connected with the third crusade, in which he took part, uniting his forces with those of Philip of France. In the course of this crusade he married the Princess Berengaria of Navarre in Cyprus. Richard left Palestine in 1192 and sailed for the Adriatic, but was wrecked near Aquileia. On his way home through Germany he was seized by the Duke of Austria, whom he had offended in Palestine, and was given up a prisoner to the Emperor Henry VI. During his captivity his brother John headed an insurrection in England in concert with the King of France, but Richard, who was ransomed, returned to England in 1194, and the movement came to nothing. Richard then passed over to Normandy, and spent the rest of his life there in warfare of no decisive character. He died in April 1199, of a wound received whilst besieging the castle of Chalus. Richard was thoroughly neglectful of his duties as a king, and owes his fame chiefly to his personal bravery.

Richard II., King of England, son of Edward the Black Prince, and grandson of Edward III., was born at Bordeaux in 1366. He succeeded the latter in 1377. In 1381 took place the insurrection headed by Wat Tyler, in the suppression of which the boy-king showed considerable capacity and boldness, but his after life did not correspond with this early promise. In his sixteenth year (1382) he married Anne, daughter of the Emperor Charles IV. Wars with France and Scotland, and the ambitious intrigues of the Duke of Lancaster, one of his uncles, disquieted some succeeding years. The proper government of the kingdom was interfered with by contests for power between the king with his favourites, and his uncle, the Duke of Gloucester, backed by the parliament. In 1389 the king dismissed Gloucester and his adherents from his council, and took the reins of government himself. In 1394 Anne of Bohemia died, and two years later Richard married Isabella of France. This union was strongly opposed by the Duke of Gloucester, who, in consequence, was suffocated in Calais, where he had been sent for safe custody. A quarrel having broken out between Richard's cousin, the Duke of Hereford, son of John of Gaunt, and the Duke of Norfolk, Richard banished them both. The next year, 1399, the Duke of Lancaster died, and Richard confiscated his estates. This unjust act was the immediate cause of the king's fall. During his absence in Ireland, Bolingbroke, as the Duke of Hereford was called, landed in Yorkshire with a small force, and the king on his return to England was solemnly deposed by parliament, September 30, 1399, and the crown was awarded to Henry. (See *Henry IV.*) Richard was imprisoned in the castle of Pomfret, where he is supposed to have been murdered in 1400.

Richard III., King of England, the last of the Plantagenet kings, born at Fotheringhay Castle in 1450, was the youngest son

of Richard, duke of York, who was killed at Wakefield. On the accession of his brother, Edward IV. he was created Duke of Gloucester, and during the early part of Edward's reign served him with great courage and fidelity. He married in 1473 Anne Neville, joint-heiress of the Earl of Warwick, whose other daughter was united to the Duke of Clarence, and quarrels rose between the two brothers over their wives' inheritance. On the death of Edward in 1483, the Duke of Gloucester was appointed protector of the kingdom; and he immediately caused his nephew, the young Edward V., to be declared king, and took an oath of fealty to him. But Richard soon began to pursue his own ambitious schemes. Earl Rivers, the queen's brother, and Sir R. Grey, a son by her first husband, were arrested and beheaded at Pomfret, and Lord Hastings, who adhered to his young sovereign, was executed without trial in the Tower. It was now asserted that the king and his brother were illegitimate, and that Richard had a legal title to the crown. The Duke of Buckingham supported Richard, and a body of peers and citizens having offered him the crown in the name of the nation he accepted it, and on July 8, 1483, was crowned at Westminster. The deposed king and his brother were, according to general belief, smothered in the Tower of London by order of their uncle. (See *Edward V.*) Richard governed with vigour and ability, but was not generally popular, and in 1485 Henry, earl of Richmond, head of the house of Lancaster, landed with a small army at Milford Haven. Richard met him on August 23d with an army of 15,000 men at Bosworth, in Leicestershire. Richmond had only 6000 men, but relied on the secret assurances of aid from Stanley, who commanded a separate royal force of 7000. In the midst of the battle, Stanley, by falling on the flank of the royal army, secured the victory to Richmond. (See *Henry VII.*) Richard possessed courage as well as capacity; but his conduct showed cruelty, dissimulation, treachery, and ambition. He has been represented as of small stature, deformed, and of a forbidding aspect; but his personal defects have probably been magnified.

Richard, Earl of Cornwall and Emperor of Germany between 1256 and 1272, during the so-called interregnum, a son of King John of England, was born in 1209. In his youth he commanded with success the army of his brother Henry III. in France. In 1236 he took the cross and went to the Holy Land, but was not able to effect much in the East. In 1256 he was chosen emperor of Germany by a faction, and was crowned king of the Romans at Aix-la-Chapelle in 1257. He was unable to obtain general recognition, and was more than once driven to take refuge in England. He was taken prisoner by Simon de Montfort at the battle of Lewes in 1264. In 1268 he again visited Germany, and held a diet at Worms in the following year. He died in England 2d April, 1272.

Richard of Cirencester, or RICARDUS CORINENSIS, a monkish chronicler of the 14th century, sometimes called the Monk of Westminster. He entered the Benedictine monastery of St. Peter's, Westminster, residing there during the remainder of his life; in 1391 he visited Rome, and died in his monastery about 1402. He is the author of a Latin history of England to the year 1348. The so-called Itinerary of Richard, De Situ Britanniæ, published in 1758, and formerly much referred to as an authority on Roman Britain, was a forgery perpetrated by Dr. C. J. Bertram of Copenhagen.

Richardson, SIR BENJAMIN WARD, M.D., born at Somerby, Leicestershire, 1828, graduated in medicine at St. Andrews University in 1854. In 1855 he edited the Journal of Health; and he gained the Astley Cooper prize by his treatise on The Cause of the Coagulation of the Blood, and the Fothergillian gold medal by a disquisition on the Diseases of the Fœtus, in 1856. He originated the use of ether spray for the local abolition of pain in surgical operations, and introduced methylene bichloride as a general anæsthetic. He was a fellow of the Royal College of Physicians and of the Royal Society, and was knighted in 1893. He published works upon medicine and hygiene, and was an earnest sanitary and temperance reformer, and well known as a public lecturer. He died in 1896.

Richardson, CHARLES, LL.D., born in 1775, died 1865. He was trained as a barrister, but devoted himself to literature. In 1815 he published Illustrations of English Philology. In 1818 he undertook the lexicographical articles in the Encyclopædia Metropolitana, and afterwards published his great work, a New Dictionary of the English Language (2 vols. 1835–37). He also wrote a work on the Study of Languages (1854), and contributed frequently to the Gentleman's and other magazines.

Richardson, Sir John, naturalist and arctic traveller, born at Dumfries 1787, died near Grasmere 1865. After studying medicine at the University of Edinburgh he entered the royal navy, in 1807, as assistant-surgeon. He served on various stations till 1819, and was surgeon and naturalist to the arctic expeditions of 1819–22 and 1825–27, under Sir John Franklin, exploring on the latter occasion the shores of the Arctic Ocean between the Mackenzie and Coppermine rivers. He wrote Geognostical Observations as an appendix to the Narrative published by Franklin (1829, London), and edited, along with Kirby and Swainson, the Fauna Boreali-Americana (4 vols. 1829–37). In 1838 he was appointed physician to the fleet, and in 1846 was knighted. In March 1848 he took charge of an expedition to search for Franklin, and on his return published The Arctic Searching Expedition (1851) and The Polar Regions (1861).

Richardson, Samuel, English novelist, was born in 1689 in Derbyshire, and received only a common school education. He early manifested a talent for story-telling and letter-writing, and at the age of thirteen was the confidant of three young women in their love secrets, and employed by them in their amatory correspondence. At the age of sixteen Richardson was bound apprentice to Mr. John Wilde, a London printer, and afterwards set up as a printer for himself and developed a successful business. When he was nearly fifty he was asked by two booksellers to compose a 'familiar letter writer.' In doing this he threw the letters into the form of a story, which he published (1741) under the title of Pamela, or Virtue Rewarded. So great was its popularity that it ran through five editions in one year, and was even recommended from the pulpit. In 1749 the appearance of a second novel, Clarissa Harlowe, fully established his literary reputation. The History of Sir Charles Grandison appeared in 1753, and was also received with great applause. In 1754 Richardson became master of the Stationers' Company, and in 1760 purchased a moiety of the patent of law printer to the king. He died in 1761, and was buried in the church of St. Bride, in Fleet Street.

Richelieu (rēsh-ly*eu*), Armand Jean du Plessis, Cardinal, Duc de, French statesman, born at Paris, 9th September, 1585; died there, 4th of December, 1642. He was the son of François Duplessis, seigneur de Richelieu in Touraine, and was originally destined for the army; but his brother, Alphonse, having resigned the bishopric of Luçon, this was bestowed on him by Henry IV. (1606). He obtained from the pope a dispensation allowing him to accept the office though under age, and in 1607 was consecrated by the Cardinal de Givry in presence of the pope himself (Paul V.). For several years he devoted himself to the duties of his see, reforming abuses, and labouring for the conversion of Protestants. But his ambition always made him turn his eyes towards the court, and having come to Paris in 1614 as deputy of the clergy of Poitou to the states-general he managed to insinuate himself into the favour of the queen-mother, Marie de Medici, who obtained for him the post of grand-almoner, and in 1616 that of secretary of state for war and foreign affairs. When Louis XIII. quarrelled with his mother (1617) Richelieu fell with her, and was banished first to Blois and then to Avignon. In 1620, however, he managed to effect a reconciliation between Mary of Medici and her son. He now obtained, through the influence of the queen-mother, the cardinal's hat, and in 1624 was admitted into the council of state. From this date he was at the head of affairs, and he at once began systematically to extend the power of the crown by crushing the Huguenots, and overthrowing the privileges of the great vassals; and to increase the influence of the French monarchy by undermining that of the Hapsburgs, both beyond the Pyrenees and in Germany. The rallying point of the Huguenots was Rochelle; and Richelieu laid siege to that city, commanding the army in person. Rochelle, supported by supplies from England, held out for some time, but was compelled to surrender by famine (Oct. 29, 1628). In order to overthrow the power of the great nobles he ordered the demolition of all the feudal fortresses which could not be used for the defence of the frontiers. After the suppression of the Huguenots his next step was the removal of the queen-mother from court, she having endeavoured to effect his fall. This he accomplished in November 1630. But this step, and the almost total annihilation of the privileges of the parliaments and the clergy, united all classes against the despotism of the cardinal, and several risings and conspiracies took place, which were suppressed by prudent and vigorous measures. In 1631 Richelieu was raised

to the rank of duke. In 1632 a rising in favour of the Duke of Orleans, the king's brother, was suppressed by the royal forces directed by Richelieu, and the Duke of Montmorency was executed. The whole period of his government was marked by a series of conspiracies of the feudal nobility, the queen-mother, the queen herself, and even Louis, against the royal power exercised by Richelieu. But he was prepared at every point and his vengeance sure. During the Thirty Years' war the cardinal employed all the arts of negotiation and even force of arms to protect the Protestants of Germany, for the purpose of humbling the power of Austria. For the same object he declared war against Spain in 1635, and the separation of Portugal from Spain was effected by his assistance (1640). He also endeavoured to weaken Austrian influence in Italy, and procured the transfer of the duchy of Mantua to the Duke of Nevers. Among the last to be crushed by him were Cinq-Mars and De Thou, who, with the king's approval, attempted to ruin the great minister. Before his death he recommended Cardinal Mazarin as his successor. Richelieu was a great statesman, but he was proud, arrogant, and vindictive. He was a patron of letters and art, and founder of the French Academy and the Jardin des Plantes. He was the author of Mémoires relating to the years 1624–38; Histoire de la Mère et du Fils, &c.

Richmond, an ancient municipal borough of England, in the county and 42 miles north-west of York (North Riding), on the left bank of the Swale. It is picturesquely situated, and has numerous interesting remains of antiquity, the most remarkable of which is the castle, comprising an area of nearly 6 acres, and one of the most majestic ruins in England. Richmond returned two members of parliament until 1867, and one member up to 1885. Pop. 4216.

Richmond, a town of England, in the county of Surrey, 12 miles W.S.W. of London, partly on an acclivity of Richmond Hill, and partly on a plain along the Thames. It is a favourite resort of Londoners for boating and other recreations, the scenery in the vicinity being very beautiful, and the view from Richmond Hill one of the finest river views to be obtained anywhere. Richmond was a favourite residence for many centuries of the monarchs of England, several of whom died there. The great park of Richmond, formed by Charles I., is inclosed by a brick wall 8 miles in length. Pop. 22,684.

Richmond, a city of the United States, capital of Virginia, is finely situated on the north side of James River, at the head of tide-water, 100 miles S.W. of Washington. The streets are generally wide and well-built, and mostly intersect each other at right angles. There are many fine buildings, including the capitol, governor's house, city hall, federal buildings, buildings of Richmond College, churches, schools, asylums, &c. The State House or Capitol contains Houdon's celebrated marble statue of Washington, and in the Capitol grounds are Foley's bronze statue of General T. J. ('Stonewall') Jackson and Crawford's bronze statue of Washington, 25 feet high, on a pedestal 42 feet high, surrounded by other bronze statues. Water-power is almost unlimited, and the various mills and factories give employment to numerous workmen. The trade staples are tobacco, iron, grain, and flour. The first occupation of any part of its site was by English settlers in 1609; the city was formally founded in 1742, and became the seat of government in 1780. During the civil war it was the seat of the Confederate government. It was invested by the Federal armies, and surrendered on April 3, 1865. Pop. 81,388.

Richmond, a city of the United States, in Indiana, on the east fork of the Whitewater, and at the junction of several important lines of railway (which connect it with Chicago, St. Louis, Cincinnati, &c.), 69 miles east of Indianapolis. Pop. 16,608.

Richter (rēh'tĕr), EUGEN, German politician, born at Düsseldorf 1838. He entered the Prussian Diet in 1869, and the Imperial Diet in 1871, and is the able and acknowledged leader of the Progressist Liberals. He is the author of several economic publications, and an eminent authority on financial questions.

Richter, GUSTAV, German painter, born at Berlin 1823, died there 1884. He was a member of the Academies of Berlin, Munich, and Vienna; executed frescoes in the Berlin Museum, and attracted attention by his Raising of Jairus' Daughter and his Building of the Pyramids, a colossal picture (at Munich). It is on his portraits, however, that his fame chiefly rests, his sitters having included many European celebrities.

Richter, JEAN PAUL FRIEDRICH, commonly called JEAN PAUL, German writer, was born March 21, 1763, at Wunsiedel, in

the Fichtelgebirge, and died November 14, 1825, at Baireuth. His father was, at the time of his birth, a teacher and organist at Wunsiedel; at a later period pastor at Schwarzenbach on the Saale. In 1781 Richter entered the University of Leipzig in order to study theology, but soon changed his plan, and devoted himself to literature. In 1784 he was forced by poverty to leave Leipzig. In 1787–94 he was a private tutor, but in the meantime he had published his Grönlandische Processe (Greenland Law-suits, 1783–84), Auswahl aus des Teufels Papieren (Selection from the Devil's Papers, 1789), and Die unsichtbare Loge (The Invisible Lodge, 1793). This brought him fame and money, and was followed by another romance, Hesperus (1795), and The Life of Quintus Fixlein (1796), a humoristic idyl, works which made his name one of the best known in Germany. In 1798 he went to Weimar, and subsequently moved to other towns, finally settling at Baireuth in 1804. He shortly afterwards received a pension from the prince-primate, Dalberg, which was afterwards continued by the King of Bavaria. While staying in Berlin in 1801 he married Karoline Mayer, a union which proved very happy. His last years were saddened by the death of his only son in 1821. Jean Paul's works (he wrote under this name) are characterized by a deeply reflective and philosophic humour, but are often whimsical and fantastic. They are full of good things, but show no sense of proportion, arrangement, or artistic finish. His writings, other than those noted above, include Blumen-, Frucht-, und Dornenstücke (Flower, Fruit, and Thorn Pieces, 1796), Der Jubelsenior (Parson in Jubilee, 1797), Das Kampaner Thal (1797), Titan (1800), Flegeljahre (translated by Carlyle 'Wild Oats,' 1804). Die Vorschule der Aesthetik (Introduction to Æsthetics), his first important philosophical work, appeared in 1804. It was followed by Levana, oder Erziehungslehre (1807), a work on education. His works connected with the history and politics of the time were: Friedenspredigt (1808), Dämmerungen für Deutschland (1809); Mars und Phöbus' Thronwechsel im Jahr 1814 (1814), Politische Fastenpredigten (1817).

Ric'imer, a general of barbarian descent who ruled the western Roman Empire by emperors whom he set up and put down at will. He dethroned Avitus in 456, and appointed Majorianus emperor, whom he caused to be assassinated in 461. He then placed Livius Severus on the throne, and on his death in 465 he carried on the government for some time alone. In 467 Anthemius was put on the throne, and gave his daughter in marriage to Ricimer. The latter soon took up arms against his father-in-law, who was assassinated in 472. Ricimer died soon after.

Ric'inus. See *Castor-oil.*

Rickets, a disease peculiar to infancy, chiefly characterized by changes in the texture, chemical composition, and outward form of the bony skeleton, and by altered functions of the other organs, transient for the most part, but occasionally permanent. The chief external features are the legs bent outward, chest unduly projecting, head large and forehead projecting, spine often curved, joints large and prominent, general form stunted, &c. Rickets is chiefly a disease of large cities, and its development is favoured by want of nourishing food, overcrowding, and neglect of sanitary and hygienic precautions generally. In the treatment of rickets all means are employed by which the system is invigorated, including good food, fresh air, and exercise. The use of splints for the legs is often beneficial, and as the child grows up nature often remedies the worst features.

Ricochet Firing, the firing of guns, mortars, or howitzers with small charges and low elevation, so as to cause the balls or shells to bound along. It is very destructive, and is frequently used in sieges to clear the face of a ravelin, bastion, or other work, dismounting guns and scattering men; and may also be used against troops in the field.

Rideau (ri-dō') **Canal**, a Canadian canal constructed between Kingston on Lake Ontario and Ottawa as a through waterway by means of the river Ottawa to Montreal, the St. Lawrence route being interrupted by rapids. Canals have since been built along the St. Lawrence to avoid these, and the Rideau is now little used.

Rider's Bone, or RIDER'S STRAIN, a hard lump which sometimes forms on the inner side of the thigh in persons who ride much.

Riding is the art of sitting on horseback with firmness, ease, and gracefulness, and of guiding the horse and keeping him under perfect command. Walking, trotting, and galloping are the three natural paces of the horse, but these may be converted into artificial paces by art and skill, by shortening

or quickening the motion of the horse. The position of a rider should be upright in the saddle; the legs and thighs should be turned in easily, so that the fore part of the inside of the knees may press and grasp the saddle, and the legs hang down easily and naturally, the feet being parallel to the horse's sides, neither turned in nor out, only that the toes should be kept a little higher than the heels. The hand holding the reins is generally kept clear of the body, and immediately over the pummel of the saddle. A firm and well-kept balanced position of the body is of the utmost consequence, as it affects the horse in every motion, and the hands and legs ought to act in correspondence with each other in everything, the latter being always subservient to the former. The art of riding is not difficult of attainment, but it is one which can only be mastered by practical instruction and constant practice.

Riding-master, an officer in the cavalry whose duty it is to instruct the officers and men in the art of riding. He is generally selected from the ranks, bears the rank of lieutenant, and is entitled to retire with a pension and the rank of captain after fifteen years' service.

Ridings, the three jurisdictions into which the county of York is divided on account of its extent. They are called the North, East, and West Ridings.

Ridley, NICHOLAS, Bishop of London in the reigns of Edward VI. and his successor Mary, was born about the commencement of the 16th century, and educated at Cambridge. He afterwards travelled on the Continent for three years, and on his return filled the office of proctor to Cambridge University. In 1547 he was chosen to the see of Rochester, and in 1550 superseded Bonner as bishop of London. On the death of Edward he was involved in an attempt to secure the Protestant ascendency by placing the Lady Jane Grey upon the throne. This, together with his connection with Cranmer, led to his being tried for heresy, and after a formal disputation on the controverted points with a deputation of Roman Catholic bishops he was condemned to the stake. This sentence he underwent with the greatest fortitude, in company with his friend and fellow-sufferer Latimer, Oct. 16, 1555, in Oxford.

Rien'zi, COLA DI, a native of Rome, born about 1312. He was the son of a tavern-keeper, acquired a good education, and early distinguished himself by his talents, and especially by his attacks on the tyranny of the nobles. In 1342 he endeavoured to induce Pope Clement VI., then at Avignon, to initiate reforms, but nothing was done. In 1347, during the absence of the governor of Rome, Stefano Colonna, Rienzi summoned a secret assembly of his friends upon Mount Aventine, and induced them all to subscribe an oath for the establishment of a plan of government which he called the *good estate*. The people conferred upon him the title of tribune, with all the attributes of sovereignty. He banished several noble families, and compelled Colonna to quit Rome. His strict regard to justice and the public good in the first exercise of his power induced even the pope to countenance him. But he subsequently became ambitious and haughty, and finding he had lost the confidence of the people he withdrew from Rome in 1348. He returned secretly to Rome in 1350, but was discovered, and fell into the hands of Pope Clement at Avignon, who imprisoned him for three years. Innocent VI. released Rienzi, and sent him to Rome to oppose another popular demagogue named Boroncelli. But after a turbulent administration of a few months he was killed in 1354.

Riesa (rē'zȧ), a town in Saxony, on the left bank of the Elbe. It has a large river trade and various industries. Pop. 7390.

Riesengebirge (rē'zen-gė-birgė; Giants' Mountains), a mountain range of Europe, separating Silesia from Bohemia and Moravia, till it joins the Carpathians; but the name is properly applied to that part of this range which lies between the sources of the Neisse and the Bober. It contains the loftiest mountains of the north or central parts of Germany, the Schneekoppe being 5257 feet high. The geological structure of the range consists of granite, gneiss, and mica slate, and in the valleys there are coal and basaltic strata.

Riesi (rē-ā'sē), a town in Sicily, province of Caltanissetta. It has large sulphur mines, and the olive and vine are here extensively cultivated. Pop. 11,914.

Riet-bok (rēt-), the Dutch name for an antelope of South Africa, which lives in reedy marshes (*Eleotrăgus arundinaceus*). Called also *Reed-buck*.

Rieti (rē-ā'tē), a town in Italy, in the province of Perugia, 42 miles N.N.E. of Rome. It is the see of a bishop, has an imposing cathedral, and manufactures of silk and woollen stuffs, &c. Pop. 9618.

Riff, or EL RIF, a district on the north coast of Morocco, long the home of pirates, who gave great trouble to the European powers by their depredations in the Mediterranean.

Rifle, a portable firearm, the interior surface of the barrel of which is grooved, the channels being cut in the form of a screw. The number of these spiral channels or threads, as well as their depth, varies in different rifles, a highly approved form being with the channels and ridges of equal breadth, and the spiral turning more quickly as it nears the muzzle. The bullet fired is now always of an elongated form. The great advantage gained by a weapon of this construction is that the bullet discharged from the piece, by having a rotatory action imparted to its axis coincident with its line of flight, is preserved in its direct path without being subject to the aberrations that injure precision of aim in firing with unrifled arms. As a necessary consequence of the projectile being carried more directly in its line of aim, its length of range, as well as its certainty in hitting the object, is materially increased. Rifles were invented in Germany in 1498, and have been used as military weapons since 1631, but were not used in the British army until the latter half of the 18th century. Till 1851 the British infantry, with the exception of those regiments known as rifle corps, was universally armed with the smooth-bore musket. In 1851 the first rifle firing an elongated bullet came in under the name of the Minié. Some of the regiments in the Crimean war were armed with this rifle, but it was cumbersome and heavy. It was succeeded in 1853 by the Enfield rifle. The chief feature of this rifle was the reduction of the bore to ·577 in. in diameter, which made it considerably lighter. Britain was longer in adopting the breech-loading system than some other countries. Up to 1866 all British rifles had been muzzle-loaders, but in that year the Snider system of converting muzzle-loading arms into breech-loaders was adopted, and the army temporarily supplied with Enfield rifles converted into Sniders. Trials on a very extensive scale followed, resulting in the acceptance in 1871 of the Martini-Henry rifle, which became the rifle of the British army from 1874 onward. In this excellent weapon the breech is closed by a block which contains a piston or striker, the latter exploding the cartridge by the force of a strong spiral spring passing round it. An improved form of this arm was subsequently produced, viz. the Enfield-Martini, in which the barrel had a smaller bore, the diameter being reduced from ·45 inch to ·40. It was then determined by the authorities to adopt a repeating or magazine rifle, and in 1887 the Lee-Metford rifle was approved of. The rifling (Metford system) is in seven grooves without corners or angles, one turn or twist in 10 inches, calibre ·303. The German needle-gun and the French Chassepot were the first of the breech-loading rifles to acquire a reputation for their use in actual warfare. Both these rifles have long been superseded, first by single-firing and then by repeating or magazine rifles, Germany having adopted the Mauser rifle and France the Lebel.

The repeating rifle is a development of a very old type of weapon. In the Spencer, the first used with signal success, the cartridges were in the stock of the arm; in the Winchester, one of the best known of repeating rifles, they are in a tube underneath the barrel. Some modern military magazine rifles draw their supply of cartridges from are serve contained in a detachable magazine, the advantage being the greater efficiency of the weapon as a single-loader. The magazine of the Lebel rifle is in the fore end of the stock. The breech mechanism usually preferred is that upon the 'door-bolt' principle, of which the Chassepot and Prussian needle-gun were well-known types; the Winchester is one of the few actuated by an under lever. In the Mannlicher, the weapon adopted by Austria, the bolt is drawn back simply; in others it has to be turned to the left before it can be withdrawn. With the Lebel the breech-bolt has two projections, which, when the bolt is turned, securely lock the bolt close to the base of the cartridge; in the Lee-Metford, a similar double-locking arrangement is placed where the projecting knob to actuate the mechanism joins the breech-bolt. The magazine of the Lee-Metford, containing eight cartridges, is placed under the stock behind the barrel, to the level of which a spiral spring in the magazine raises the cartridges. The breech-bolt, which contains the firing mechanism and extractor, when pushed forward forces the raised cartridge into the barrel. The magazine is detached by pressing a 'catch', or blocked by a 'cut-off', when the rifle may be used as a single-loader.

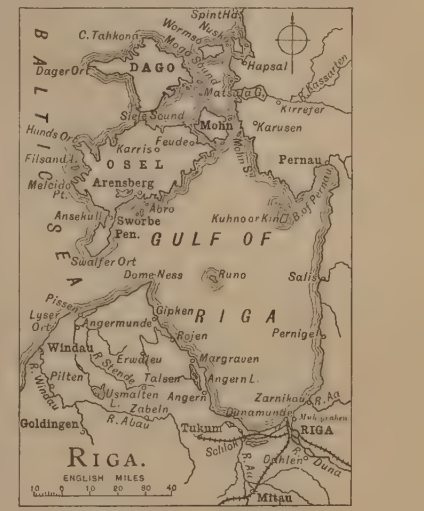
When Whitworth produced his hexagonal

bore rifle of ·450 calibre, it was thought that the bullet was of insufficient diameter, and the ·577 was adopted in its stead; later, after twenty years' experience with the ·450 Martini-Henry, the bore has been still further reduced, chiefly owing to the discoveries of Hebler, whose Swiss rifle of 7½ millimetres was found to give increased velocity, greater range, equal accuracy, and at the same time permitted of lighter ammunition being used. The bullet is coated with thin steel, ferro-nickel, or other hard metal, so that it shall not strip in the rifling, which has a sharp twist, one complete turn in less than 12 inches, and leaves the muzzle at a velocity of 2000 or more feet per second, thus giving an extreme range of 3500 yards. Improved explosives, almost smokeless and which do not foul the barrel, have added to the success of the small-bore rifle.

Sporting rifles have a shorter range and inferior velocity to the best military weapons, their object being not extreme range or penetration, but great force at impact to produce such a shock as will paralyse the game shot.

Rifle Regiments, RIFLES, a term applied to bodies of troops armed with rifles, and formerly more or less employed as sharpshooters. The name has now lost nearly all its meaning, as the whole infantry are now provided with rifles. Under the British territorial army scheme the *Rifle Brigade* consists of four battalions of regulars and five of militia; they wear a green uniform with black facings, and have their headquarters at Winchester.

Riga, a seaport of Russia, capital of the government of Livonia, on both sides of the Duna or Dwina, about 5 miles above its mouth in the Gulf of Riga. It is situated on a sandy flat, and in the older parts consists of narrow winding streets, huddled together, while the more modern parts are much better built. The river is crossed by a bridge of boats, and on both sides are spacious quays, which afford excellent promenades. The public buildings are numerous, but few of them are deserving of particular notice, except the cathedral, a Gothic building of the 13th and 16th centuries, St. Peter's Church, the castle or governor's residence, and the town-hall. The manufactures are not of great importance, but the trade is very extensive, the principal exports being flax, hemp, timber, linseed, grain, &c. Ships can come up to the town, or they may unload and take in cargo at Dünamünde, the port and fortress at the mouth of the river. Half of the trade is with Britain. Pop. 182,754,



of whom nearly half are Germans, and Protestants by religion.

Riga, or LIVONIA, GULF OF, a gulf of the Baltic, which washes the coasts of Courland, Livonia, and Esthonia, and contracts in the west to a comparatively narrow entrance, the island of Osel almost closing it on the north-west. The chief river which it receives is the South Dwina.

Right, PETITION OF. See *Petition of Right.*

Right Ascension. See *Ascension.*

Right of Way, the right of passing over land not one's own. Rights of this kind are public if enjoyed by everybody; private, if enjoyed by a certain person or description of persons. Wherever there is a public right of way, there is a highway. The origin of a highway is generally said to be in a dedication thereof by an owner to the public; and such dedication may be express or implied. It will be implied from the use of the highway by the public for a moderate number of years. But a highway may also be established by act of parliament. A private right of way may be acquired by immemorial usage, or by existing for forty

years, or by express grant by deed. In Scotland a public right of way is acquired by possession for the prescriptive period of forty years, or from time immemorial.

Rights, BILL AND DECLARATION OF. See *Bill.*

Rights of Man, a theoretical declaration passed by the French National Assembly in August 1789. It was attacked by Edmund Burke in his Reflections on the French Revolution. Thomas Paine replied to Burke in his Rights of Man. See *Paine, Thomas.*

Rigi (rē′gē), an isolated rocky mountain of Switzerland, in the canton of Schwyz, between Lakes Zug and Lucerne, 5905 feet high. It affords among the finest views in Switzerland, and is annually visited by numerous travellers. Two railways have been constructed to reach its summit (Rigi-Kulm) from opposite sides. They are on the 'rack-and-pinion' principle, there being a central toothed rail into which works a toothed wheel under the locomotive. There is also a short line on the mountain worked on the ordinary principle. Hotels and similar establishments are numerous on the Rigi.

Rigor Mortis, the rigidity of limbs that follows death. It is one of the signs of cessation of life.

Rig-veda, the first and principal of the Vedas or sacred hymns of the Hindus. See *Vedas.*

Rilie′vo (rē-lē-ā′vō). See *Relief.*

Rim′ini (anciently *Arimĭnum*), a town of N. Italy, in the province of Forlì, on the Marecchia, less than a mile from its mouth in the Adriatic. It is surrounded with walls, and entered by four gates; has a cathedral, built in the 14th but remodelled in the 15th century, after the designs of Leon Battista Alberti; the church of San Giuliano, with a superb altar-piece, by Paul Veronese; the church of San Girolamo, with a fine painting by Guercino; the triumphal arch of Augustus, of simple and massive architecture; and the bridge of Augustus over the Marecchia, built of white marble, and still in perfect preservation. The harbour is now so silted up as to admit only small vessels. Pop. 10,838, or with suburbs about 20,000.

Rimu, a New Zealand tree (*Dacrydium cupressinum*) of the yew family. It grows to a height of 80 to 100 feet, and from 2 to 6 feet in diameter. Its wood is valued for general building purposes.

Rinderpest (German name), or CATTLE-PLAGUE, a contagious disease which attacks animals of the ox family, and is attended with the most deadly results. The disease appears to be identical with what was formerly known as murrain, and is sometimes called the steppe-murrain, from the Russian steppes, which are its habitat. This disease has caused great havoc among cattle for at least a thousand years, spreading occasionally like a pestilence over Europe. In 1865–67 there was a very serious visitation of it. It appeared in a dairy in the north of London in the month of June 1865, and spread with great rapidity. The treatment of the disease having proved a failure, the privy-council adopted the policy of 'stamping-out' or killing all infected animals, while cattle fairs having proved powerful instruments in transmitting the disease, the movements of cattle were subjected to the most stringent regulations. During this outbreak between 200,000 and 300,000 cattle died of the plague, or were ordered to be killed on account of it. These measures were attended with beneficial results. It reappeared again in 1867, but was speedily got under. The probable cause of the disease is a micro-organism which is found in the blood and all the discharges of the infected animals, and is capable of being transmitted indirectly by any of these to great distances. Sheep and other animals can be affected by the disease, but in a less intense form. The period of incubation varies from two to ten days. The symptoms are elevation of the temperature of the body, followed by a heightened colour of the mucous membrane of the mouth, and granular yellowish eruptions on the gums, lips, tongue, palate, and cheeks. The skin becomes congested, and develops scales with papular eruptions, and finally a slimy discharge comes from the eyes and nose. The name is also given to an eminently fatal cattle disease of America, differing, however, from the true rinderpest in attacking cows only, and in running its course in three days in place of seven, the general duration of the European form of the disease.

Ring, an ornament for the fingers which has been worn from the most ancient period of civilization. Among the ancient nations who are known to have attached special importance to the wearing of rings were the Assyrians, Egyptians, Hebrews, Greeks, and Romans. The nose, ears, arms, and even the legs and toes have also, among various people, been decorated with them. Rings have also from a very early period been

reckoned as symbols of authority, which could be delegated by merely delivering the ring to an agent; they were also used as symbols of subjection. The earliest mention of rings is in the book of Genesis, and relates to the Hebrews. Among the Egyptians rings of gold were worn in great profusion. The common people wore porcelain rings. The Greeks and Romans used them for sealing contracts, closing coffers, &c. The modern use of wedding rings was probably derived from the Jews. A ring appears from an early period to have been one of the insignia of a bishop. Motto rings date from the time of the Romans, and were long popular in Britain.

Ringbone, an exostosis or bony tumour mostly met with on the coronet of overworked horses, but sometimes seen on colts, or even newly-dropped foals. Ringbone injures a horse's market value, and is practically incurable.

Ring-dotterel (*Charadrius hiaticŭla*), a species of plover pretty common in Britain, where it frequents the shores of bays or inlets of the sea and of rivers, feeding on worms, insects, small crustacea, &c. It has its name from a white ring round the neck.

Ring-dove, or CUSHAT (*Columba palumbus*), the largest of the pigeons inhabiting Britain, a bird which occurs very generally throughout the wooded parts of Europe. It is migratory in countries in which the severe winters preclude the possibility of its obtaining a due supply of food, and even in Britain, in which it permanently resides, it appears on the approach of winter to assemble in flocks, and to perform a limited migration, probably in search of food. A bluish-gray colour prevails generally over the head, cheeks, neck, back, and rump, whilst the breast and under parts of the neck are of a purplish red, the belly and thighs dull white. A patch of white on either side of the neck forms a sort of ring or collar. The average length is about 16 or 17 inches. The food of the ring-dove consists of grain, acorns, berries, the leaves and tops of turnips, &c. The nests are composed of sticks and twigs loosely placed together. The birds are wary and shy, and rarely breed in confinement.

Ringed-snake, a harmless colubrine snake (*Tropidonŏtus* or *Coluber natrix*), with teeth so small as to be incapable of piercing the skin. It is common in England. It feeds on frogs, mice, young birds, &c., which it swallows alive. It is torpid during winter.

Ring-money, a form of currency consisting of rings which seems to have originated with the Egyptians. It is still used in parts of Africa, and is manufactured in Birmingham for the use of African traders. A similar form of money was found by Cæsar among the Celts of Gaul, and appears also to have prevailed in Britain, as well as among the Scandinavian nations of Northern Europe.

Ring Ouzel. See *Ouzel.*

Ringworm, a chronic contagious disease of the hair, hair-bulbs, and epithelial covering of the skin. It is due to a microscopic fungus, which lays hold upon and preys upon these tissues, and is very contagious. It is known by the decolorization and brittleness of the affected hairs, by the scaly eruption, and roundness of the affected patches. Ringworm is most commonly found on the scalp. The treatment of the disease consists in destroying the vitality of the fungus, which is effected by a solution of sulphurous acid or of corrosive sublimate.

Rinmann's Green, same as *cobalt-green.*

Riobamba, a town of South America, in Ecuador, 80 miles north-east of Guayaquil. Pop. 20,000, chiefly Indians.

Rio Branco. See *Branco.*

Rio Bravo, or RIO GRANDE DEL NORTE. See *Norte.*

Rio-de-Janeiro (rē-o-de-zhà-nā'i-ro), the

capital of the republic of Brazil, and the largest city of South America, is most beau-

tifully and advantageously situated on the south-eastern coast, on a fine natural harbour formed by a bay of the same name. The city, which has a picturesque appearance from the bay, is built on flat ground along the shore or on the slopes of low hills. Upon nearer approach it is found that the houses are small and mean-looking, the streets narrow and ill-paved, especially in the older part, and that even the public buildings are without much architectural merit. The finest buildings are the opera-house, senate-house, military barracks, and the national museum, while the churches are chiefly notable for their gaudy interior decorations. A striking feature in the city is the aqueduct, which brings the water a distance of 12 miles and here crosses a wide valley on a beautiful double-tier of granite arches. Among benevolent institutions are the Casa da Misericordia, several other hospitals, and a large lunatic asylum. There are two col-

View of Rio-de-Janeiro.

leges, medical schools, a naval and military academy, numerous scientific establishments, public schools, national library, a botanical garden, and observatory. At Rio is the chief military arsenal of the republic, while on one of the islands in the bay there is a naval arsenal with docks and building yards. The bay has its entrance, 1700 yds. wide, between Fort St. Juan and Fort Santa Cruz, and extends inwards 15 miles, with a width varying from 2 to 8 miles. It is diversified with numerous islands, surrounded by hills covered by luxuriant tropical vegetation, and affords safe anchorage for the largest vessels. Manufactures are unimportant, but there is an extensive trade in coffee, sugar, hides, tobacco, timber, &c. The principal imports are linen, woollen, and cotton tissues; iron and steel goods, and provisions and preserved meats. The city is the central terminus of the railways of the country; tramways have also been worked for some time. The first settlement in the neighbourhood of Rio-de-Janeiro was formed by some French refugees in 1555. A Portuguese force took possession of the settlement in 1567, and laid the foundations of a new city, which has grown into the present capital of Rio-de-Janeiro. Pop. 522,621.—The province of Rio-de-Janeiro has an area of about 28,000 miles, and is decidedly mountainous in the centre. It is the best-cultivated province in Brazil, the chief crop being coffee. Immense herds of cattle are reared, and the forests are rich in timber. Pop. 1,227,575.

Rio-Grande, a river of W. Africa, which enters the Atlantic by an estuary opposite the Bissagos Islands; upper course not well known.

Rio-Grande-del-Norte. See *Bravo.*

Rio-Grande-do-Norte (Grand River of the North), a maritime state at the north-east angle of Brazil; area. 22,196 square

miles. The surface is mountainous, and not generally fertile. Agriculture and cattle-rearing form the principal branches of industry. The capital is Natal or Rio-Grande-do-Norte (pop. 8000), a seaport at the mouth of the small river Rio-Grande-do-Norte, exporting some cotton, sugar, &c. Pop. of state, 313,979.

Rio-Grande-do-Sul, the most southern state in Brazil, bounded partly by the Atlantic, and bordering with Uruguay and the Argentine Republic, has an area of 91,336 sq. miles, and a pop. of 899,100. It is well watered, contains much fertile land, and has a healthy climate. On the coast is the large lake or lagoon of Patos, besides others. The chief occupations of the inhabitants are cattle-rearing and agriculture. Among the population are 100,000 Germans, there being a number of flourishing German settlements. There are some 600 miles of railway. Hides, tallow, horse-hair, bones, &c., are exported. The capital, RIO-GRANDE, or SÃO PEDRO DO RIO-GRANDE, is situated on a peninsula near where the Lake of Patos communicates with the Atlantic. Its houses are mostly of earth, and its streets unpaved. It has an active trade in hides, horse-hair, wool, tallow, &c. Pop. 18,000 or 19,000.

Rioja (rē-ō′hȧ), FRANCISCO DE, a Spanish lyric poet, born at Seville about 1600, died in 1659. He was latterly assessor of the supreme tribunal of the Inquisition. As a poet he followed classic and Italian models, and his poems exhibit purity and grace of diction, deep feeling, and a vigorous imagination.

Rioja (rē-ō′hȧ), LA, one of the western provinces of the Argentine Republic. It is well watered on the west, but in the east and south there are salt and sand deserts. The climate is dry and healthy. The inhabitants are chiefly engaged in agriculture and cattle-rearing. Excellent wheat, wine, and fruits are produced. Pop. 100,000. —Chief town, LA RIOJA, at the foot of the Sierra Velasco, in the midst of vineyards and orange groves. Pop. 8000.

Riom (rē-ōn), a town of France, in the department of Puy-de-Dôme, 10 miles north of Clermont. The streets are spacious, and the houses, being built of dark lava, present a somewhat gloomy appearance. The chief manufactures are linen, silk, and hardware. Pop. 8304.

Rion. See *Phasis.*

Rio Negro (Spanish 'black river'), the name of numerous streams, of which two are important:—(1) A river of S. America, and principal tributary of the Amazon. It rises in Colombia, and joins the Amazon after a course of about 1000 miles at Manaos, Brazil. Through its affluent, the Cassiquiari, there is direct communication between the Amazon and Orinoco. See *Cassiquiari.* (2) A river of S. America forming the boundary between the Argentine Republic and Patagonia. It rises in the Andes in Chili, and is about 700 miles long. Its current is very rapid, and its bed obstructed with shoals and sand-banks.

Rione′gro, a town in the S. American Republic of Colombia, prov. Antioquia, 12 miles S.W. of Medellin. Pop. 10,000.

Rione′ro in Voltu′re, a town of S. Italy, prov. Potenza, at the foot of Mt. Volture. Pop. 11,383.

Rio Salado. See *Salado.*

Riot, a disturbance of the public peace, attended with circumstances of tumult and commotion, as where an assembly destroys, or in any manner damages, seizes, or invades private or public property, or does any injury whatever by actual or threatened violence to the persons of individuals. By the English common law a riot is an unlawful assembly of three or more persons which has actually begun to execute the common purpose for which it assembled by a breach of the peace, and to the terror of the public. A lawful assembly may become a riot if the persons assembled form and proceed to execute an unlawful purpose to the terror of the people, although they had not that purpose when they assembled. Every person convicted of riot is liable to be sentenced to hard labour. In Scotch law rioting is termed mobbing. A person may be guilty of mobbing who directs or excites a mob although he is not actually present in it. Mere presence without participation may constitute mobbing. By act 1 George I. cap. v. s. 2, called the Riot Act, whenever twelve or more persons are unlawfully assembled to the disturbance of the peace, it is the duty of the justices of the peace, and the sheriff and under-sheriff of the county, or of the mayor or other head officers of a city or town corporate, to command them by proclamation to disperse. And all persons who continue unlawfully together for one hour after the proclamation was made, commit a felony, and are liable to penal servitude or imprisonment (substituted for death by 7 Will. 4 and 1 Vict.). The act also contains a clause indemnifying the

officers and their assistants in case any of the mob should be killed or injured in the attempt to arrest or disperse them. Compensation out of the rates is paid to persons sustaining damage by riot.

Rio Tinto Mines, celebrated copper mines in the south-west of Spain, province of Huelva, near the Rio Tinto. Since the recent development of the mines a town of some 11,000 inhabitants has grown up.

Riouw. See *Rhio.*

Riparian Rights. See *Rivers.*

Ripley, a town of England, in Derbyshire, 10 miles N.N.E. of Derby; collieries, ironworks, manufactures of lace. Pop. 6813.

Ripley, GEORGE, an American author, born at Greenfield, Massachusetts, 1802; died 1880. Educated at Harvard College and Cambridge Divinity School, he became a Unitarian minister in Boston, lived some years in Europe, was one of the founders of the Transcendental magazine, the Dial (on which he had Emerson and Margaret Fuller as coadjutors), and the originator and conductor of the communistic experiment at Brook Farm. He became literary editor of the New York Tribune in 1849, and was joint editor with C. A. Dana of the American Cyclopædia (1858–63, 16 vols., also of the second edition).

Rip'on, a cathedral city, formerly a parliamentary borough of England, county of York (West Riding), on the Ure, 22 miles N.N.W. of York. It has a spacious marketplace and an elegant town-hall. The cathedral dates from the latter half of the 12th century, and is partly Early English, partly Decorated in architecture, with two towers, each 110 feet high. It was recently thoroughly restored, and is one of the finest churches in England. The other buildings include a free grammar-school (founded by Queen Mary), an infirmary, and a mechanics' institution. Ripon ceased to send a member to parliament in 1885. Pop. 7512.

Ripos'to, a seaport in the east of Sicily, prov. Catania, with a trade in wine, oil, &c. Pop. 7209.

Ripple-marks, the wavy or ridgy marks left on the beach of a sea, lake, or river by the ripples or wavelets. Such marks have often been preserved when the sand has hardened into rock, and are held by geologists as indications that deposition of the beds in which they occur took place on the sea-shore or at a depth not greater than 60 feet. We have also wind ripple-marks and current ripple-marks, and it requires much discrimination to determine the producing cause.

Risca, town of Monmouthshire, on the Ebbw, with coal and iron mines, &c. Pop. 7783.

Rishis, certain sages of the Hindu mythology, sprung from the mind of Brahma.

Rissole (ris'ol), in cookery, an entrée consisting of meat or fish mixed with breadcrumbs and yolk of eggs, all wrapped in a fine paste, so as to resemble a sausage, and fried.

Risto'ri, ADELAIDE, Italian actress, born 1822. At a very early age she played in comedy, but afterwards appeared in tragedy. She married the Marquis Capranica del Grillo in 1847, and afterwards played in all the chief European capitals. She took her farewell of the English stage in Manchester, Nov. 8, 1873. Among her chief characters are Medea, Francesca da Rimini, Marie Antoinette, Mary Stuart, and Lady Macbeth.

Ritornel'lo (Italian), in music, a short repetition as of the concluding phrases of an air; or a passage which is played whilst the principal voice pauses; or it often signifies the introduction to an air or any musical piece. Ritornelli are also Italian popular songs in stanzas of three lines each. The metre and number of the syllables are not subject to rule. The first line, however, is generally the shortest.

Ritschl (richl), FRIEDRICH WILHELM, German classical scholar, born 1806. After attending the gymnasiums at Erfurt and Wittenberg he went to Leipzig and Halle, where he devoted himself to classical studies. In 1832 he was appointed extraordinary professor at Halle University. He subsequently held professorships at Breslau and Bonn, and in 1865 accepted a call to Leipzig University, where he remained until his death in 1876. His chief work is a critical edition of Plautus's Comedies (3 vols. 1848–54, incomplete; entirely remodelled edition in course of publication). His other works include Parerga Plautina and Terentiana, and Priscæ Latinitatis Monumenta Epigraphica. He also contributed largely to philological journals.

Ritson, JOSEPH, English literary antiquarian, born 1752, died 1803. He became a conveyancer in London and deputy-high-bailiff to the Duchy of Lancaster, and edited many old and rare books. He was noted for his industry and integrity, but was a quarrelsome critic. His chief works are: A

Select Collection of English Songs (1783), Ancient Songs from the Time of King Henry II. to the Revolution (1790), a Collection of Scottish Songs (1794), Robin Hood Poems (1795), Ancient English Metrical Romances (1802), &c.

Rittenhouse, David, American astronomer, born in Pennsylvania 1732, died 1796. Originally a clock and mathematical instrument maker, he became master of the U.S. mint, and succeeded Franklin as president of the American Philosophical Society. He was the first to use spider-lines in the focus of a transit instrument.

Ritter, Heinrich, a German philosopher, born in 1791, studied theology and philosophy at Halle, Göttingen, and Berlin from 1811 to 1815. In 1824 he became an extraordinary professor of philosophy in Berlin, accepted an ordinary professorship at Kiel in 1833, and subsequently occupied the chair of philosophy at Göttingen University from 1837 till his death in 1869. Ritter's chief work is a general History of Philosophy (Geschichte der Philosophie; 12 vols. 1829–55). He also published a System of Logic and Metaphysics; a Cyclopædia of the Philosophical Sciences; a popular Treatise on Immortality; and other works.

Ritter, Karl, German geographer, born 1779, died 1859. He studied at Halle, became a private tutor in 1798, and in 1819 succeeded Schlosser as professor of history at the Frankfort Gymnasium. He then published an Introduction to the History of European Nations before Herodotus, 1820; and in the same year became professor extraordinary of geography at the University of Berlin, where he remained until his death. His great work is Die Erdkunde im Verhältnisse zur Natur und Geschichte des Menschen (Geography in its Relations to Nature and History), the two first volumes of which appeared in 1817–18, but it ultimately comprised upwards of twenty volumes. He wrote several other geographical works, and contributed extensively to the journals of the Berlin Geographical Society.

Ritual, the series of rites or ceremonies established in connection with any religion; or the book in which religious services are prescribed and detailed. See *Liturgy*.

Ritualism, a strict adherence to rites and ceremonies in public worship. The term is more especially applied to a tendency recently manifested in the Church of England, resulting in a series of changes introduced by various clergymen of the High Church party into the services of the Church. These changes may be described externally as generally in the direction of a more ornate worship, and as to their spirit or animating principle, as the infusion into outward forms of a larger measure of the symbolic element. They are defended on the grounds of law, ancient custom, inherent propriety, and divine sanction or authority. The Ritualists hold, with most others, that all authoritative and obligatory regulation upon ritual is not laid down in the New Testament, but they, or many of them, maintain that a knowledge of what is obligatory in ritual is derived from apostolical tradition, going back to apostolical times. They argue that the design of the institution of Christianity was not to abrogate the external ceremonials by which the patriarchal and Mosaic dispensations in the Old Testament were distinguished; but to replace them by a higher ceremonial, and they explain the comparative simplicity of primitive worship by the secrecy and restraint to which the early church was subjected. The points of ritual about which there has been the most violent contention are those which involve the adoration of Christ as present on the altar under the forms of bread and wine. Other points are: the eastward position of the priest at consecration; lights on the holy table; the use of various vestments; the use of incense; mixing water with wine for communion; fasting before communion from previous midnight; regular confession to a priest, with absolution and penance; &c. The legal position of the Ritualists is that the first Book of Common Prayer, issued in the second year of Edward VI. (1549, with alterations made in 1552, 1604, and 1662), is still the guide of the church in all matters pertaining to ritual, the present Prayer-book not being in itself complete, but referring to this first Prayer-book in its opening rubric. Various judgments have been given in ecclesiastical courts against extreme Ritualists, and some of their proceedings have been pronounced illegal. Ritualistic practices have been generally condemned by the bishops, and an act of parliament giving them power to restrain innovations of this kind came into force on 1st July, 1875. The ritualistic movement in the Church of England arose out of the high church movement inaugurated by the Tractarians. See *Tractarianism*.

Rive-de-Gier (rēv-dė-zhyā), or simply Rive, a town of France, department of the

Loire, 25 miles E.S.E. of Montbrison, on the Gier. The coal-field which surrounds the town is the most valuable in France. There are glass-works, spinning and other mills, foundries, machine and iron works, &c. Pop. 13,542.

River-crab, a name given to a genus of crabs (*Thelphusa*), inhabiting fresh water, and having the carapace quadrilateral and the antennæ very short. One species (*T. depressa*) inhabits muddy lakes and slow rivers in the south of Europe.

River-hog, the name occasionally given to the capybara. See *Capybara*.

River-horse, a name sometimes given to the hippopotamus (which see).

Rivers rank high in importance among the natural features of the globe, and are intimately connected with the history and condition of mankind. They have always formed important highways of communication, and the great cities built upon their banks have constituted in all ages the seats of empire. Every circumstance concerning rivers is therefore of importance, as their source, length of channel, outlet, rapidity of current, depth, and consequent capability of navigation. The source of a river is either a spring or springs, or a lake, or the river takes its origin from the melting of the snow and ice on mountains. The termination of a river is usually in the sea, a lake, or another river, or it may lose itself in the sand. All the streams which ultimately gather into one river form a *river system*, and the region which is drained by such a system of streams is called a *river basin*. River basins are usually separated from each other by more or less elevated ground, and the line of greatest elevation between them is called a *watershed*. In speaking of the *right* and *left* bank of a river we are always supposed to have the position of a person looking in the direction towards its mouth. The volume of water which rivers contain varies with many conditions, dependent upon the nature of the sources by which they are fed and the amount of rainfall throughout their course. The periodical melting of the snows adds greatly, in some cases, to the volume of rivers which have their origin in mountain regions, the rainy season in tropical regions has a similar effect (as in the case of the Nile), often causing extensive inundations. In arid countries the so-called rivers are often mere surface torrents, dependent on the rains, and exhibiting merely the dry beds of water-courses during the season of drought. The 'creeks' of Australia and the 'wadies' of the Arabian Desert are of this character. The average fall of a river's bed is indicated by the difference between the altitudes of its source and its outlet compared with its length of channel. The fall of many great rivers is much less than might be supposed. The Amazon has a fall of only 12 inches in the last 700 miles of its course. The Volga, which rises at an elevation of 633 feet above the Caspian Sea, has an average inclination of less than 4 inches to the mile throughout its course of more than 2000 miles. The Aberdeenshire river Dee, which rises at a height of 4060 feet, has a course of only 87 miles to its outlet, showing an average declivity of 46 feet per mile. Many rivers carry down immense quantities of earthy matter which accumulates at their mouths forming what is called a *delta* (which see). Among the great rivers of the world are the Mississippi and Missouri (4200 miles) and the Amazon (3900 miles), in America; the Yang-tse-Kiang, the Amoor, the Yenisei, the Indus, and Ganges in Asia, all over 1500 miles in length; the Congo (3000 miles), the Niger (2600 miles), and the Nile (4200 miles), in Africa; and the Danube (1670 miles), Volga (2200 miles), and the Rhine (800 miles), in Europe.

By English and other law navigable rivers are held to be the property of the state (so far as navigation extends); non-navigable rivers belong to the proprietors through whose grounds they flow. The state has thus control and jurisdiction of the shores of navigable streams, while in the case of a non-navigable stream the proprietors of estates on opposite banks of it are supposed to own the ground over which it flows respectively to the centre of its bed, and may fish it accordingly. They do not own the water, the property in which is shared by the owners above and below. A particular proprietor cannot dam up or divert the water, or alter the banks so as to injure the property of his neighbour. To prevent pollution of rivers an act of parliament called the Rivers Pollution Prevention Act was passed in 1876. It prohibits the putting of solid matters of a deleterious character into streams, also the drainage of sewers into streams. As regards manufacturing and mining pollutions all proceedings are now to be instituted by the County Council or some sanitary authority, and no such proceedings are to be taken without the consent of the

Local Government Board. The board, in giving or withholding its consent, is to have regard to the industrial interests involved in the case and to the circumstances and requirements of the locality. An inspector of the board may, if action for pollution is taken, certify before a county court that the means used for rendering harmless the polluting matter are the best under the circumstances of the particular case. In such a case the court may refuse to interfere, but appeal may be made to the civil courts.

River Terraces, terraces on the sides of a valley through which a river flows, formed by the action of the water when the river bed had a higher elevation at some remote period.

River-tortoise, a name of a family of tortoises that are aquatic in their habits, coming to shore only to deposit their eggs. They are exclusively carnivorous, subsisting on fishes, reptiles, birds, &c. The edges of the mandible are so sharp and firm that they easily snap off a man's finger. Well-known species are the soft-shelled turtle (*Trionyx ferox*) and the large and fierce snapping turtle (*Chelydra serpentina*) of America. (See *Snapping-turtle.*) They inhabit almost every river and lake in the warmer regions in the Old and New Worlds, and are particularly plentiful in the Ganges, where they prey on human bodies.

Rivet, a short metallic pin or bolt passing through a hole and keeping two pieces of metal together; especially, a short bolt or pin of wrought iron, copper, or of any other malleable material, formed with a head and inserted into a hole at the junction of two pieces of metal, the point after insertion being hammered broad so as to keep the pieces closely bound together. Rivets are especially employed in making boilers, tanks, iron bridges, &c. They are closed up by hammering when they are in a heated state, the hammering being either done by hand or by machinery.

Riviera (riv-i-ā′ra), the name given to a portion of the coast of North Italy, on each side of the town of Genoa. It extends to Spezzia on the east and Nice on the west, and is much resorted to by invalids.

Riviere (ri-vēr′), BRITON, subject and animal painter, born in London 1840. He studied art under his father, a drawing-master at Cheltenham and Oxford, and is an Oxford graduate. He has exhibited at the Royal Academy since 1864; elected A.R.A. in 1878, and R.A. in 1881. Among his chief pictures, many of which have been engraved, are: Strayed from the Flock, The Lost Sheep, Legend of St. Patrick, An Anxious Moment, Circe, Giants at Play, Actæon, Væ Victis, Rizpah, A Fool and His Folly, &c.

Riv′oli, a town of N. Italy, beautifully situated on the last slopes of the Alps, in the province and 8 miles west of Turin. The environs are studded with villas belonging to the inhabitants of Turin, with which it is connected by a magnificent planted avenue. Pop. 5540.

Rivoli-Verone′se, a village of N. Italy, 14 miles north-west of Verona, between Lake Garda and the right bank of the Adige, where Napoleon defeated Alvinczy on 14th January, 1797.

Rix Dollar, the English way of writing the names of different silver coins used in various European states; as the *rigsdaler* of Denmark = 2*s.* 2½*d.*; the Swedish *riksdaler* = 1*s.* 1½*d.*

Rizzio, DAVID, a native of Turin, came to Scotland in 1564 in the train of the ambassador from Savoy, and soon became so great a favourite with the queen that he was appointed her secretary for foreign languages. (See *Mary Stuart.*) The distinction with which he was treated by his mistress soon excited the envy of the nobles and the jealousy of Darnley. A conspiracy, with the king at its head, was formed for his destruction, and before he had enjoyed two years of court favour the Lord Ruthven and others of his party were introduced by Darnley into the queen's apartment, where they despatched the object of their revenge, 9th March, 1566. Popular tradition assigns to Rizzio the improvement of the Scottish style of music, but many of the airs which have been ascribed to Rizzio are easily traced to more distant periods.

Roach (*Leuciscus rutilus*), a species of

Roach (*Leuciscus rutilus*).

fresh-water fish of the carp family (Cyprinidæ), found in Britain and other parts of

Europe. Their average length is about 9 or 10 inches. They are of a grayish-green colour, the abdomen being silvery white and the fins red. The average weight of the roach is under 1 lb., and though a favourite with anglers, it is not much esteemed for the table. Allied fishes receive the same name in America.

Roads are artificial pathways formed through a country for the accommodation of travellers and the carriage of commodities. Though the Romans set an example as road-builders, some of their public highways being yet serviceable, the roads throughout most of Europe were in a wretched condition till towards the end of the 18th century. France was in advance of other countries in road-making; in England a decided improvement of the highways only began in the 19th century. The first important point to be considered in road-making is the route to be followed, a matter in which natural obstructions and inequalities of level have to be taken into account, besides the question of directness of route, the deviations advisable in order to accommodate certain centres of population, the expense of upkeep, &c. Natural obstructions are overcome by special contrivances, such as bridges, embankments, tunnels, &c. When diversities of level are necessary, road-engineers fix the degree of inclination at the lowest possible point. Telford estimated the maximum inclination of a road to be 1 in 24, but except in extreme cases it is considered better that it should not exceed 1 in 50. The *angle of repose*, or maximum slope on which a carriage will stand, has been estimated at 1 in 40. The width of the road is also a very important consideration as bearing both on the original cost and on the permanent maintenance. A properly-constructed road, besides a foundation, consists of two layers, an upper and an under. After a good foundation is obtained the laying of a base, the best material being concrete of gravel and lime, gives durability to the road. Upon this base the actual roadway is laid with a slight inclination from the centre to the sides for the purpose of drainage. Before the time of Macadam it was customary to use broken stones of different sizes to form the roadway, the consequence being that in course of time the smaller stones sank, making the road rough and dangerous. Macadam early in the present century (see *Macadam*) introduced the principle of using stones of uniform size from top to bottom. (See also *Pavement.*) The general superintendence of roadways is usually exercised by the government of a country, but it intrusts the execution of its enactments to local authorities. Highways are public roads which every subject has a right to use. They are constituted by prescription, by act of parliament, or by dedication to the public use. Highways are regulated in Britain by various acts, and are now under the control of the County Councils. Formerly they were managed by local trustees or commissioners, and their upkeep maintained by tolls levied on the traffic, such roads being denominated *turnpike* roads. These tolls in Scotland were abolished in 1883, while in England they are now comparatively few, their gradual disappearance being facilitated by recent turnpike acts. What is known as the *rule of the road* is that in passing other horsemen or carriages, whether going in the same or the opposite direction, the rider or driver must pass on the right hand of the other rider or driver. The use of steam locomotives is permitted on public roads under certain restrictions.

Road-steamers. See *Steam-engine.*

Roanne (ro-ân), a town in France, department of the Loire, on the left bank of the Loire, which is here navigable, 40 miles N.W. of Lyons. It is an important railway centre, and manufactures woollen, linen, and cotton goods; the trade is extensive, especially in coal from the Loire coal-field. Pop. 29,355.

Roanoke (ro-a-nōk'), a navigable river, U. States, Virginia and North Carolina, which after a course of about 250 miles falls into Albemarle Sound. It is tidal for 75 miles. —The town of Roanoke, Virginia, finely situated on this river, has recently become a flourishing industrial centre. Pop. 16,159.

Roaring, in horses, is a disease of the nerves and muscles of the larynx which causes an obstruction to the passage of air, giving rise, when the horse is briskly exercised, to the peculiar sound from which the disease derives its name. The cause of the disease is in most cases attributed to fatty degeneration and atrophy of the laryngeal nerve, which brings about an atrophy of the muscles of the larynx on the side affected, and thus causes the arytenoid cartilage to obstruct the passage. The disease generally affects the left side, and is not, as a rule, amenable to treatment. Several cases have been cured lately by excision of a portion of the affected arytenoid cartilage, and this

operation promises to be very successful in this disease.

Roasting is the cooking of meat by the direct action of fire—that is, by dry heat, either before the fire or in an oven. Roasting before an open fire is considered preferable to roasting in an oven (which is analogous to baking), on account of the free ventilation to which it exposes the meat during the process. The apparatus in most kitchens for open roasting are a fire, a spit, a contrivance for turning the meat to present all sides of it alternately to the fire, a screen to economize the heat, and a saucepan to catch the dripping. The fire must be kept even and bright throughout. During the process of roasting, the meat should be basted with the dripping to keep it soft and allow the heat to penetrate. The speciality of roasting as compared with boiling is that it retains the saline ingredients of the meat. The time allowed for roasting is roughly estimated at a quarter of an hour to 1 lb. of meat. Longer time is required in winter than in summer, and for new than old killed meat.

Robbery, a felonious and forcible taking away another man's goods or money from his person, presence, or estate by violence or putting him in fear. Violence or intimidation is the criterion which distinguishes robbery from other larcenies; and it is sufficient that so much force or threatening, by word or gesture, is used as might create an apprehension of danger, so as to lead a man to part with his property against his will. Highway robbery, or the forcible taking of property from travellers, in many countries is a capital offence, and in all civilized countries is severely punished.

Robbia, Luca Della. See *Della Robbia.*

Robert, Duke of Normandy, surnamed *the Devil*, was the younger son of Duke Richard II. by his marriage with Judith, a daughter of Count Godfrey of Brittany. In 1027 he succeeded his elder brother, Richard III., whom he is charged with having poisoned. The first years of his government were employed in bringing his rebellious vassals into subjection, and he then restored Count Baldwin of Flanders to his states, assisted Henry I., king of France, against his mother Constantia, and humbled Count Otho of Champagne. In 1034 his fleet was wrecked off Jersey whilst on its way to England to support his nephews Alfred and Edward against Canute, who had excluded them from the succession to the English throne. Hereupon he concluded a truce with Canute, by which the two princes were promised half of England. In 1033 he set out to visit the holy places, and subsequently made the pilgrimage to Jerusalem on foot. While returning he died suddenly at Nicæa in Asia Minor (1035), and is supposed to have been poisoned by his servants. His heroic deeds and penance have given rise to numerous stories. William the Conqueror was his son.

Robert I. See *Bruce, Robert.*

Robert II., King of Scotland, was the son of Marjory, daughter of Robert Bruce, and of Walter, steward of Scotland, and was thus the first of the *Stewart* or *Stuart* kings. He was born 1316, and was recognized by parliament in 1318 as heir to the crown. On the death of David II. he was crowned at Scone, 26th March, 1371. He had long acted as regent, and had done good service in the English wars. An act of parliament in 1375 settled the crown on his sons by his first wife Elizabeth Mure of Rowallan, illegitimate by ecclesiastical law. His reign was comparatively a peaceful one, one of the chief events being the battle of Otterburn. He died in 1390.

Robert III., King of Scotland, eldest son of the preceding, was born in 1340 and was originally called John, but changed his name on his coronation, in 1390. Having been lamed by accident he was unable to engage in military pursuits, and he trusted the management of affairs almost entirely to his brother, whom he created Duke of Albany. In 1398 Albany was compelled to resign his office by a party who wished to confer it on the king's eldest son, David, duke of Rothesay. War was renewed with England, and the battle of Homildon Hill, 14th September, 1402, resulted in a disastrous defeat of the Scots. In this year the Duke of Rothesay died in Falkland Castle, where he had been imprisoned; and it was commonly believed that he was starved to death at the instigation of Albany. Dread of Albany, who had recovered the regency, induced the king to send his second son, James, to France in 1406; but the vessel which carried him was captured by the English, and Henry IV. long detained him as a prisoner. Soon after this event Robert died (1406).

Robert of Gloucester, an English historian, is supposed to have been a monk in the abbey of Gloucester during the reign of Edward I., but of his private history nothing

is known. His history of England, in verse, extends from the period of the fabulous Brutus to about A.D. 1300, and its language is the transition stage of English previous to Chaucer. Its chief value is as one of the monuments of the English of this period.

Roberts, DAVID, R.A., painter, was born in Edinburgh in 1796, died 1864. He was apprenticed to a house-painter, but, with a view to the higher branches of his art, he pursued the study of drawing and painting. After a seven years' apprenticeship he became a scene-painter, and in 1821 was engaged as painter for Drury Lane Theatre. In 1826 he exhibited at the Royal Academy views of the cathedrals of Rouen and Amiens. Soon after he abandoned scene-painting, and 1832–33 visited Spain, publishing a selection of Spanish sketches in 1837. From 1836–39 he furnished the drawings for the Landscape Annual, for Picturesque Sketches in Spain, and for Bulwer Lytton's Pilgrims of the Rhine. In 1838 he made a tour in the East, after which he published Sketches in Egypt, the Holy Land, &c., 4 vols. large folio. In 1848 he exhibited the Chancel of the Collegiate Church of St. Paul, Antwerp, which has become the property of the nation. His Destruction of Jerusalem appeared in 1849; the Inauguration of the Exhibition of all Nations, 1853; Rome, 1855; Christmas Day and St. Peter's at Rome, 1856. In 1859 he published an illustrated volume entitled Italy,—Classical, Historical, and Picturesque, and at the time of his death he was engaged on a series of views of London from the Thames. He was elected an associate of the Academy in 1831, and a full member in 1841. Roberts is the best architectural painter Britain has produced, and as a painter of interiors has few equals.

Roberts, FREDERICK SLEIGH, LORD, V.C., son of Sir Abraham Roberts, was born in 1832. He entered the army and became a lieutenant in the Bengal Artillery in 1851 and a captain in 1860. He gained the Victoria Cross in the Indian mutiny, and was made brevet-major. He took part in the Abyssinian war 1867–68, and in 1872 was made a C.B. for his services in India on the Lushai expedition. He commanded a column in the Afghan war of 1878, and after a brilliant march from Cabul to Candahar utterly defeated Ayoub Khan. In 1881 he was created a baronet and G.C.B. He succeeded Sir Don. Stewart in command of the Indian army, 1885, and was made a peer in 1892. He became field-marshal and commander-in-chief in Ireland 1895. Author of Forty-one Years in India (1897).

Robertson, FREDERICK WILLIAM, a celebrated preacher, was born in London 1816. He attended the grammar-school of Beverley, and in 1830 became a pupil of the Edinburgh Academy, and afterwards attended the university of that city. Failing to obtain a commission in the army, he matriculated at Brasenose College, Oxford, in 1837, with a view to enter the church. He was ordained in 1840, and took priest's orders a year later. He then went abroad, and at Geneva married the daughter of Sir George William Denys. From 1842 to 1846 he was curate at Christ Church, Cheltenham. He then went to Germany, and endeavoured to acquaint himself with the views of German theologians. He became incumbent of Trinity Chapel, Brighton, in 1847; and continued in this charge with increasing fame as a preacher till his death in 1853. His views on the Sabbath, the atonement, baptism, and inspiration were assailed as unorthodox, and he was accused of preaching democracy and socialism. The energy with which he devoted himself to his profession is said to have shortened his days. Besides occasional addresses, his published works embrace Lectures and Addresses on Literary and Social Topics (8vo, London, 1858), Analysis of Tennyson's In Memoriam (1862), and several series of sermons and lectures.

Robertson, JOSEPH, LL.D., Scottish antiquary, was born at Aberdeen in 1810, died 1866. He was educated at the school of Udny, at Aberdeen Grammar School, and Marischal College, Aberdeen. He was apprenticed to an advocate in Aberdeen, and early took to literature. In 1835 he published a humorous Guide to Deeside under the pseudonym of John Brown. In 1839 he became editor of the Aberdeen Constitutional, a Conservative newspaper, and assisted in founding the Spalding Club. He became editor of the Glasgow Constitutional in 1843, and prepared several volumes of local antiquities for the Maitland Club. In 1849 he was appointed editor of the Edinburgh Evening Courant, which post he resigned in 1853 to become curator of the historical department of the Register House. The University of Edinburgh conferred on him the degree of LL.D. in 1864. His works include the Book of Bon-Accord, an archæological and historical guide to Aberdeen (1839), Topography and Antiquities of the Counties of

Aberdeen and Banff (1842–69), Inventory of Queen Mary's Jewels, Dresses, &c. (1863), and Concilia Ecclesiæ Scoticanæ (1866).

Robertson, Thomas William, dramatist, born 1829, died 1871. His parents being actors, he early went on the stage, but was never a success. In 1853 he settled in London, where for several years he struggled on with light literature. In 1864 he had considerable success with David Garrick, a play produced by Sothern; but his fame rests on a series of plays produced at the Prince of Wales' Theatre (1866–70), including Ours, Caste, Play, School, and M.P. Though sneered at on their production by certain critics, and nicknamed 'cup-and-saucer dramas,' they have deservedly secured a permanent place on the stage. His principal Dramatic Works (2 vols.) were published in 1890 by his son.

Robertson, William, D.D., historian, was born at Borthwick, in East Lothian, where his father was minister, in 1721; died 1793. After the completion of his course in the theological class of Edinburgh Robertson obtained a license to preach in 1741, and in 1743 was presented to the living of Gladsmuir, in East Lothian. He soon obtained an ascendency in the General Assembly of the Church of Scotland by his eloquence and great talents for public business, which, exerted in favour of Conservative principles, gave him for a long time the lead in the ecclesiastical politics of Scotland. His History of Scotland during the reigns of Queen Mary and King James VI. appeared in 1759 (two vols. 4to). This work led to the author's appointment as chaplain of Stirling Castle in 1759, one of the king's chaplains in 1761, and principal of the University of Edinburgh in 1762. Two years after he was made historiographer-royal of Scotland. His History of the Reign of Charles V. appeared in 1769, his History of America in 1777, and in 1791 An Historical Disquisition concerning the Knowledge which the Ancients had of India. As a historian he is admired for skilful and luminous arrangement, distinctness of narrative, and highly graphical description. His style is pure, dignified, and perspicuous.

Robespierre (rob-es-pi-ār), François Maximilien Joseph Isidore, was born at Arras in 1758, and was the son of an advocate. He was educated at the College of Louis-le-Grand at Paris. He afterwards practised as an advocate at Arras, and held for a short period the position of judge in the bishop's diocese. In 1789 he was elected deputy to the states-general, and was a zealous supporter of democratic measures. At this time he became a prominent member of the Jacobins and other revolutionary clubs. In March 1791 he was appointed

Maximilien Robespierre.

public accuser to the New Courts of Judicature. He remained in the background during the September massacres of 1792, which he assisted in planning, leaving the work with Marat and Danton. In the same month he was elected a member of the convention, and in the proceedings against Louis XVI. distinguished himself by the relentless rancour with which he opposed every proposal to avert or delay the fatal result. On 19th March, 1794, the Hébertists (see *Hébert*) fell victims to his jealousy. Eleven days later he caused Danton to be arrested, who, after a trial of three days, was guillotined, together with Camille Desmoulins, on April 5th. Robespierre's power now seemed to be completely established, and the Reign of Terror was at its height. On June 8, 1794, he, as president of the convention, made the convention *decree* the existence of the Supreme Being; and on the same day he celebrated the Feast of the Supreme Being. In the meantime a party in the Convention was formed against Robespierre, and on July 27 he was openly accused of despotism. A decree of arrest was carried against him, and he was thrown into the Luxembourg prison. He was released by his keeper on the night of the

same day, and conducted to the Hall of Commune, where his supporters were collected. On the following day Barras was sent with an armed force to effect his arrest. Robespierre's followers deserted him, and he was guillotined on July 27th, 1794, together with some twenty-three of his supporters. The tendency with modern writers is to modify the character for infamy which at one time obtained regarding Robespierre.

Robin, a name given to several birds, more especially to the robin redbreast of Europe (see *Redbreast*) and to an American species of blackbird (*Merŭla migratoria*), as also to the bluebird of America. See *Bluebird*.

Robin Goodfellow. See *Puck*.

Robin Hood. See *Hood, Robin*.

Robinia. See *Locust-tree*.

Robins, Benjamin, mathematician and artillerist, was born at Bath in 1707. He was self-educated, and attained an extraordinary knowledge of mathematics, a subject which he taught in London. He also made experiments on projectiles, and his chief work, the New Principles of Gunnery, appeared in 1742. In 1749 he became engineer-in-chief to the East India Company, and fortified Madras, where he died of fever in 1751. He is believed to have had a share in the preparation of the narrative of Anson's Voyage Round the World (1740–44).

Robinson, Rev. Edward, D.D., LL.D., biblical scholar and explorer of the Holy Land, born at Southington, Connecticut, 1794; died at New York 1863. He graduated at Hamilton College, Clinton (N.Y.), and in 1823–26 was an instructor in Hebrew in Andover Theological Seminary. In 1826 he came to Europe, studied at Göttingen, Berlin, and Halle, and returned in 1830 to his native country; became a professor of biblical literature at Andover, and published several works elucidating sacred history and literature. In 1833 he resigned his professorship on account of ill-health, and subsequently resided some years at Boston. In 1837 he made a voyage to the Holy Land, returning to Berlin in 1838. The result of this journey was his great work entitled Biblical Researches in Palestine, Mount Sinai, and Arabia Petræa (1841, 3 vols.), subsequently enlarged after a second visit to Palestine in 1852. He had been appointed to the chair of biblical literature in Union Theological Seminary, New York, but only entered on the duties in 1840, occupying the post till his death. He also wrote a Physical Geography of the Holy Land.—His second wife (married in 1828), Therese Albertine Louise von Jakob, born at Halle 1797, was known as an author before her marriage under the name of Talvi. In 1822 she published translations of Old Mortality and the Black Dwarf in German. In 1825–26 she published Volkslieder der Serben and a few tales under the nom-de-plume of Psyche, and in 1834 translated into German Pickering's work on the Indian tongues. She also wrote a Review of the Slavic Languages, Characteristics of the Popular Songs of the German Nations (1840), wrote several novels, and contributed to magazines both German and English. She died at Hamburg in 1870.

Robinson, Henry Crabb, born at Bury St. Edmunds 1775, died 1867. He studied law in London, and German literature and philosophy in Germany, where he became intimate with Goethe, Schiller, and most of the German men of letters of the time. On his return to England he took to journalism, and was foreign correspondent to the *Times* in Spain, Germany, and elsewhere. He was intimately acquainted with almost every man of eminence in his time, and his Diary, Reminiscences, and Correspondence, published in 1869, is a perfect mine to students of literary and social history.

Robinson Crusoe, a celebrated romance, written by the well-known Defoe and published in 1719. See *Defoe*.

Rob Roy (that is, 'Robert the Red'), a celebrated Highland freebooter, whose true name was Robert Macgregor, but who assumed his mother's family name, Campbell, on account of the outlawry of the clan Macgregor by the Scotch parliament in 1662. He was born about 1660. He was the younger son of Donald Macgregor of Glengyle, by his wife, a daughter of Campbell of Glenfalloch. His own designation was of Inversnaid, but he seems to have acquired a right to the property of Craig Royston, on the east side of Loch Lomond. Like other Highland gentlemen, Rob Roy was a trader in cattle previous to the rebellion of 1715, in which he joined the adherents of the Pretender. On the suppression of the rebellion the Duke of Montrose, with whom Rob Roy had previously had a quarrel, took the opportunity to deprive him of his estates; and the latter began to indemnify himself by a war of reprisals upon the property of the duke. An English garrison was stationed at Inver-

snaid, not far from Aberfoyle, the residence of Rob Roy; but his activity and courage saved him from the hands of his enemies, from whom he continued for some time to levy black-mail. In his latter years he became reconciled to Montrose, and died at Balquhidder in 1734. See Sir Walter Scott's Introduction to the novel of Rob Roy.

Roc, a fabulous bird of immense size and strength, which is mentioned in the Arabian Nights Entertainments. A belief in it was spread in Europe during the middle ages, having been brought from the East probably as a consequence of the Crusades.

Roc'ambole (*Allium scorodoprăsum*), a species of onion, having bulbs resembling those of the garlic. It is cultivated for the same purposes, and is considered as having a more delicate flavour.

Roccella. See *Archil.*

Rochambeau (ro-shàn-bō), JEAN BAPTISTE DONATIEN DE VIMEUR, COUNT DE, Marshal of France, born 1725, entered the French army in 1742, distinguished himself in the Seven Years' war, and became field-marshal in 1761. In 1780–82 he commanded the French forces sent to aid the revolted British colonists in America. He became governor of Artois and Picardy, and subsequently of Alsace, was made a marshal in 1790, and commanded the army of the north in 1792. During the Reign of Terror he narrowly escaped the guillotine. He died in 1807.

Rochdale, a municipal and parliamentary borough of England, in Lancashire, 10 miles N.N.E. of Manchester. Rochdale is a place of considerable antiquity, and was early noted for its woollen manufactures, which have remained a chief staple till the present day. Cotton is extensively manufactured, and there are also foundries, machine-shops, &c.; while in the neighbourhood are quarries of freestone and extensive collieries. The town is irregularly built, and has many narrow streets, but of late years has been much improved. The parish church (St. Chad), of the 12th century, situated on an eminence, is approached from the lower part of the town by a flight of 122 steps. The town-hall is a fine modern building, and there is a handsome free library. Rochdale is the centre of the co-operative movement, which originated there in 1844. By means of canals it has a water communication with all the industrial centres of the north of England. Pop. 71,458.

Rochefort (rosh-fōr), or ROCHEFORT-SUR-MER, a strongly fortified seaport and naval arsenal of France, in the department of Charente-Inférieure, on the right bank of the Charente, about 9 miles above its mouth, 20 miles south of La Rochelle. It stands mostly on a low swampy flat, is regularly built, and is surrounded by ramparts. In the military port the largest vessels float at all times. Attached to it are shipyards, workshops, and storehouses of various kinds. A large naval hospital is outside the town. There is a good trade in colonial produce, wine, brandy, &c. Pop. 26,534.

Rochefort (rosh-fōr), HENRI (VICTOR HENRI, MARQUIS DE ROCHEFORT-LUÇAY), a French journalist, dramatist, and politician, born in Paris 1832. Here he at first studied medicine, but on the death of his father in 1851 he obtained a post in the prefecture. In 1859 he wrote for the Charivari, and he became one of the principal writers on the Figaro. Having been dismissed from the latter post by order of the ministry, he founded a weekly paper called La Lanterne in 1868, in which he vigorously attacked the emperor and the ministry. It was seized early in its career by the police, and Rochefort was fined and imprisoned. In 1869 he was returned to the legislative assembly by the first arrondissement of Paris. He then started a new paper, the Marseillaise, and for its attacks on the imperial family he was sentenced to six months' imprisonment in January 1870. After Sedan he became a member of the government of National Defence. He fled from Paris in May 1871 when he foresaw the end of the Commune, of which he had been a vigorous supporter, but was arrested by the Versailles government and sentenced to transportation to New Caledonia. He escaped in 1874, and after the general amnesty of 1880 returned to Paris (July 12th), where he founded his new journal the Intransigeant. He was returned as deputy by the department of the Seine, but resigned his seat in Feb. 1886. His influence suffered from his joining in the Boulangist movement.

Rochefoucauld, FRANÇOIS, DUC DE LA. See *La Rochefoucauld.*

Rochejaquelein, HENRI DE LA. See *La Rochejaquelein.*

Rochelle (ro-shell), LA, a fortified town and seaport, France, capital of the department of Charente-Inférieure, on the Atlantic, 95 miles north by west of Bordeaux. The chief buildings are the cathedral, town-hall, exchange, courts of justice, hospital, arsenal, and a public library. The harbour is easily

accessible and commodious. The roadstead is protected by the islands of Ré and Oléron. La Rochelle has an extensive trade in wines, brandies, and colonial produce. In the religious wars it was long a Protestant stronghold. It stood an eight months' siege in 1572, but was forced to surrender by famine after three months in 1628. Pop. 17,745.

Rochelle Salts, the double tartrate of sodium and potassium, crystallizing in large rhombic prisms. It has a mild, hardly saline taste, and acts as a laxative.

Roches-moutonnée (rosh-mö-ton-ā), the name given to the rounded and smoothed humps of rock occurring in the beds of ancient glaciers from their fancied resemblance to the backs of sheep (*moutonné*, sheep-like). They have received their form and smoothness from the action of ice.

Roch'ester, a city, parliamentary borough, and river-port in England, in the county of Kent, 29 miles south-east of London, on the Medway, adjoining Chatham. It consists of Rochester proper, on the right bank of the river, and of Strood and part of Frindsbury parish on the left bank, communication being kept up by an iron swing-bridge. Rochester consists principally of one spacious street, which traverses it in a S.S.E. direction towards Chatham, and of a number of minor streets. It was a place of importance even before the Roman period. The see was founded by the Saxon king of Kent, Ethelbert, who also founded the cathedral early in the 7th century. This edifice was destroyed by the Danes, but was rebuilt in the beginning of the 12th century, and renovated in 1827–34. The massive square keep of the castle, built in the reign of the Conqueror, still remains, and is surrounded by public gardens. Rochester carries on fishing and some other industries, and has a trade in coal, &c. Many of the inhabitants are employed in Chatham dockyard. It returns one member to parliament. Pop. 26,309.

Rochester, a city of the United States, capital of Monroe county, New York state, on both sides of the Genesee (over which are several bridges), 7 miles above its entrance into Lake Ontario, on the Erie Canal, which here crosses the river by a splendid aqueduct. The town is well built, among buildings and institutions being a Roman Catholic cathedral, a court-house and city-hall, a university, a Baptist theological seminary, a free library, an athenæum, &c. The prosperity of Rochester is partly due to the immense water-power furnished by the falls of the Genesee, which within the city limits makes a descent of 268 feet, one of the falls having a height of 96 feet. This power is employed in driving flour-mills, which are here on a great scale, and also in various other industrial establishments. The suburbs are highly cultivated, there being a great extent of nursery grounds. In 1812 two log-huts were the only buildings on the site now occupied by Rochester. Pop. 133,896.

Rochester, JOHN WILMOT, EARL OF, a witty and profligate nobleman of the court of Charles II., was born in Oxfordshire in 1647 or 1648, and educated at Wadham College. He succeeded to the title and estates in 1659. He served in the fleet under Lord Sandwich, and distinguished himself at the attack on Bergen. On his return to England he became the personal friend and favourite of the king. His constitution gave way under his habits of drunkenness and debauchery, and he died in 1680. His poetical works consist of satires, love-songs, and drinking-songs, many of them gems of wit and fancy, and many of them daringly immoral.

Roche-sur-Yon (rosh-sûr-yoŋ), LA, formerly NAPOLÉON VENDÉE and BOURBON VENDÉE, a town of France, capital of the dep. of Vendée, on the river Yon, 49 miles S. of Nantes. It was made the capital of the department by Napoleon I. in 1807, being then a mere village. Pop. 8789.

Rochet (roch'et), a lawn or lace garment, somewhat like the surplice in shape, but with close-fitting sleeves, worn by bishops and other high ecclesiastical dignitaries.

Rochette, DÉSIRÉ RAOUL, often called *Raoul-Rochette*, a French archæologist, born in 1790, for a number of years keeper of medals and antiquities at the Royal Library, and professor in archæology at the Collége de France, from 1838 secretary of the Academy of Fine Arts. He died at Paris in 1854. His principal works are: Histoire Critique de l'Etablissement des Colonies Grecques (4 vols., 1815), Monuments inédits d'Antiquités (1828), Mémoires de Numismatique et d'Antiquité (1840), Mémoires d'Archéologie Comparée. His Letters on Ancient Art were translated into English by H. M. Westropp, and published in 1854.

Rock, in geology, is a term applied to any considerable aggregation of mineral matter, whether hard and massive like granite, marble, &c., or friable and unconsolidated like clay, sand, and gravel. In popular language, however, it is confined to any large

mass of stony matter, as distinguished from soil, mud, sand, gravel, &c.

Rock-cod, a name in America for food fishes of the genus *Scorpæna*.

Rock-crystal. See *Quartz*.

Rocket (*Brassica erūca*), a cruciferous plant of the cabbage genus growing wild in many parts of Europe. It has a strong, disagreeable odour, an acrid and pungent taste, but is much esteemed by some, and especially by the Italians, who use it in their salads. Its medicinal properties are antiscorbutic and stimulant. The stem is about 1½ foot high, rough, with soft hairs, and bearing long pinnated leaves; the flowers are whitish or pale yellow, with violet veins. The term rocket is also applied to the different species of *Hesperis* — cruciferous plants with purple flowers, often cultivated for ornament in gardens.

Rocket, a projectile consisting of an iron cylinder filled with an inflammable composition, the reaction of the gases produced by the combustion of which, pressing on the head of the rocket, serve to propel it through the air. Rockets were first used in eastern countries. Sir W. Congreve first made them of iron, and introduced them into the British service under the name of Congreve rockets. They were kept point first by the use of a stick, which acted on the principle of an arrow's feathers. But the rocket now used in the British service has no stick, being kept point first by rapid rotation, imparted to it by means of three curved shields fixed on the base so as to be on the same side of each vent. (See the accompanying figure.) Rockets may be discharged from tubes or troughs, or even laid on the ground. In war rockets are chiefly used for incendiary purposes, for moral effect—especially frightening horses, and for various irregular operations. *Signal* and *sky* rockets are small rockets formed of pasteboard cylinders, filled with combustible materials, which, when the rocket has attained its greatest height and bursts, cast a brilliant light which may be seen at a great distance. For another variety of rockets see *Life-rockets*.

Rocket.

Rock-fish, or BLACK GOBY (*Gobius niger*), a British fish belonging to the family of the gobies. This fish is found on rocky coasts chiefly and inhabits the deeper rock-pools left after the receding tide. The body is generally covered by an abundant mucous secretion, beneath which the small scales covering the body are almost concealed. Some of the wrasses are also occasionally known by the name of 'rock-fishes,' as are also American fishes of the genus *Scorpæna*. See also *Bass*.

Rockford, a city of the United States, in Illinois, finely situated on the Rock River, 93 miles W.N.W. of Chicago. It has abundant water-power, woollen and cotton factories, iron-foundries, agricultural machine and implement factories, wagon and carriage factories, &c. Pop. 23,584.

Rockhampton, the port of Central Queensland, on the Fitzroy River, 35 miles from its mouth, connected with North Rockhampton by a handsome bridge. The streets are wide, lined with trees, and ornamented with numerous handsome buildings. Among the latter are several churches, town-hall, court buildings, government offices, grammar-school, hospital, asylum, public library, and museum. Port Alma, at the mouth of the Fitzroy, is a fine natural harbour, where ocean-going steamers can load or discharge their cargoes, but vessels of 1500 tons come up to Rockhampton. Rich gold-fields are in the vicinity, and the sugar-cane plantations are important. Pop. 11,629.

Rocking-stones, or LOGAN STONES, large blocks of stone poised so nicely upon the point of a rock that a moderate force applied to them causes them to rock or oscillate. Sometimes a rocking-stone consists of an immense mass, with a slightly rounded base resting upon a flat surface of rock below, so that a single person can move or rock it. Some rocking-stones are evidently artificial, having had a mass of rock cut away round the centre point of their bases; others are due to natural causes, such as decomposition, the action of wind and water, &c. Several of these stones are found in Britain, and a celebrated one in the county of Cornwall has been computed to weigh upwards of 90 tons.

Rock Island, a thriving town of Illinois, U. States, on the Mississippi, at the foot of the Upper Rapids, deriving its name from an island in the river, on which there is now an extensive government arsenal. It is a great centre of railway and river traffic, and is connected with Rock Island and with Davenport on the opposite side of the river by a railway and general traffic bridge. Pop. 13,634.

Rockland, a seaport of the United States, in Maine, on the south-west side of Penobscot Bay. Pop. 8174.

Rockling (*Motella vulgāris*), a British fish included in the cod family, and known also as the three-bearded rockling from the barbs on its snout, two other species being known respectively as the four-bearded and the five-bearded rockling. The flesh is much esteemed.

Rock-oil. See *Petroleum.*

Rock-pigeon, a pigeon that builds its nest in hollows or crevices of rocks and cliffs, especially the *Columba livia.*

Rock River, a river of the United States, which rises in Wisconsin, 50 miles west of Lake Michigan, and falls into the Mississippi 2 miles below Rock Island City. Length, 330 miles, about 225 of which have been ascended by small steam-boats.

Rock-rose. See *Cistus.*

Rock-salt, native chloride of sodium, that is common salt, in the solid form, in masses or beds. See *Salt.*

Rock-scorpion (*Buthus* or *Scorpio afer*), a species of scorpion found in Africa, averaging about 6 inches in length. The bite of this animal, although not absolutely fatal, is yet considered to be dangerous.

Rock-snake, or NATAL PYTHON (*Python Natalensis*), a non-venomous African snake, attaining a length of over 25 feet. Like the boas it conceals itself in some situation coiled round some fixed object, whence it can readily and surely fasten on its prey, which it crushes among its muscular folds.

Rocky Mountains, a name indefinitely given to the whole of the extensive system of mountains which covers a great portion of the western half of North America, but more properly applied to the eastern border of this mountain region, commencing in New Mexico in about 32° 30′ N. lat., and extending throughout the continent to the Polar Sea; terminating west of the Mackenzie River, in lat. 69° N., lon. 135° W. The Rocky Mountains in the United States are divided into two parts in Southern Wyoming by a tract of elevated plateaus. The chief groups of the southern half are the Front or Colorado Range, which in Wyoming has a mean elevation of 9000 feet (at Evan's Pass, where it is crossed by the Union Pacific Railway, 8269 feet). In Colorado it increases to a mean height of 13,000 feet, its highest points being Gray's Peak (14,341 feet), Long's Peak (14,271 feet), and Pike's Peak (14,147 feet). The Sawatch Range, south of the Arkansas River, has its highest peak in Mount Harvard (14,375 feet), with passes at an elevation of from 12,000 to 13,000 feet. The 'Parks' of Colorado are high mountain valleys, known as North, Middle, South, and San Luis parks, with an elevation of from 6000 to 10,000 feet, surrounded by ranges 3000 to 4000 feet higher. The west border of the San Luis Park is formed by the San Juan Range with at least a dozen peaks over 14,000 feet, and between one and two hundred above 13,000 feet. On the north-eastern side this park is bounded by the Sangre de Cristo Range, in which is Blanca Peak (14,464 feet). The Uintah Range, directly west of North Park, has several points above 13,000 feet; and the Wahsatch Range, which forms the western limit of the southern division of the Rocky Mountains, rises to a height of 12,000 feet just east of Salt Lake City. The northern division of the Rocky Mountains, with the exception of the Wind River Range and the Yellowstone region (see *Yellowstone*), is lower and has less impressive scenery than the southern. In Idaho and Montana the groups are more irregular in outline than in the south, and the division into ranges more uncertain. Of these the Bitter Root Mountains in part of their course form the divide between the Missouri and the Columbia. There two ranges reach altitudes of upwards of 9000 feet, and are crossed by a number of passes at elevations of from 5500 to 6500 feet. The Northern Pacific Railway crosses at Mullan's Pass (5548 feet) through a tunnel 3850 feet long. The Crazy Mountains, north of the Yellowstone, reach a height of 11,000 feet; other groups are the Big Horn Mountains and the Black Hills, whose highest point is Mount Harvey (9700 feet). In Canada the highest known peaks are Mount Brown (16,000 feet) and Mount Hooker (15,650 feet), lying about 53° N. lat.; the general altitude of this part of the range varying from 10,000 to 14,000 feet. The pass leading between Mount Brown and Mount Hooker, called the Athabasca Portage, has a height of 7300 feet. The Rocky Mountains contain some of the finest scenery in the world, and are specially rich in deposits of gold, silver, iron, copper, &c., which are worked extensively.

Roco'co, a debased variety of the Louis-Quatorze style of ornament, proceeding from it through the degeneracy of the Louis-Quinze. It is generally a meaningless

assemblage of scrolls and crimped conventional shell-work, wrought into all sorts of

Rococo Ornament.

irregular and indescribable forms, without individuality and without expression.

Rocou. Same as *Annatto* (which see).

Rocroi, or ROCROY (rok-rwà), a small fortified town of France, dep. Ardennes, near the Belgian frontier, celebrated for the victory gained (1643) by the Duke d'Enghien (afterwards the great Condé) over the Spaniards. Pop. 2900.

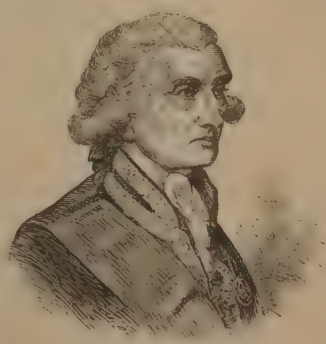
Rod, a measure of length equal to 16½ feet. (See *Pole.*) A square rod is the usual measure of brick-work, and is equal to 272¼ square feet.

Roden'tia, or RODENTS, an order of mammalia, comprising the gnawing animals, such as rats, mice, squirrels, rabbits, &c. They are distinguished by the following characteristics: the teeth are limited to molars and incisors, canines being entirely absent; the molars have tuberculated or flattish crowns, and are especially adapted for the attrition of food; the incisors are long, and spring from permanent pulps, thus being continually reproduced and shoved outwards from their bases. In the typical species the outer faces of the incisors are covered with hard enamel, but not the inner ones, hence the latter are soft and wear away faster than the anterior surfaces, thus keeping a sharp edge on the teeth. The digits are generally four or five in number, and are provided with claws. The intestine is long, and the cæcum generally large. The brain is almost destitute of convolutions. The eyes are placed laterally. The rodentia are divided into two main divisions or sub-orders, viz. *Simplicidentata*, represented by mice, rats, squirrels, marmots, beavers, porcupines, &c., having the incisors strictly limited to two in each jaw; and *Duplicidentata* or *Lagomorpha*, comprehending hares and rabbits, distinguished by four incisors in the upper jaw and two in the lower.

Roderick, last of the Visigoth kings of Spain, an almost legendary personage. On the deposition of King Witiza in 710 he was elevated to the throne. Shortly after his reign began, a conspiracy was formed against him by the sons of Witiza and others, including Count Julian, governor of Ceuta, who invited Musa, the leader of the Moors in North Africa, to assist them. Roderick met them at Xeres de la Frontera, where he was completely defeated with heavy loss, being killed in the battle. His fate is the theme of several old Spanish romances, and of poems by Scott and Southey.

Rodez, or RHODEZ (rō-dās), a town of S. France, capital of the department of Aveyron, on a height above the Aveyron, 85 miles north-west of Montpellier. It has steep narrow streets and mean houses, mostly of wood; a cathedral, with a lofty and singularly-constructed tower, episcopal palace, public library, town-house, &c. Pop. 15,333.

Rodney, GEORGE BRYDGES, Baron Rodney, British naval hero, born in 1718 at Walton-upon-Thames. He became a lieutenant in the navy in 1739, first obtained a ship in 1742, and in 1749 went to Newfoundland as governor. On his return in 1752 he was elected member of parliament for Saltash. In 1759, having been promoted to the rank of admiral, he bombarded



Lord Rodney.

Havre de Grâce in face of the French fleet. In 1762 he reduced Martinique, and on his return was rewarded with a baronetcy. In 1779 he was appointed to the chief command on the West India station, and in

January 1780 completely defeated a Spanish fleet under Langara off Cape St. Vincent. He sailed for the West Indies again in 1781, and on April 12, 1782, obtained a decisive victory over the French fleet under De Grasse. A barony and a pension of £2000 were bestowed upon him for his services. Rodney died 21st May, 1792.

Rod'olph (or RUDOLF) **I.**, OF HAPSBURG, Emperor of Germany, founder of the imperial house of Austria, was born in 1218, being the eldest son of Albert IV., count of Hapsburg and landgrave of Alsace. On the death of his father he succeeded to territories of a very moderate extent, which, in the spirit of the times, he sought to augment by military enterprises. In 1273 he was elected emperor, and was crowned at Aix-la-Chapelle. In consequence of Ottocar, king of Bohemia, refusing to do homage, war ensued, and Ottocar was defeated and slain. The emperor then employed himself to restore peace and order to Germany, and put down the private fortresses. After having laid a permanent foundation for the prosperity of his family he died in 1291, leaving Austria and other possessions to his son Albert, who was also elected emperor. (See *Albert I.*) Few princes have surpassed him in energy of character and in civil and military talents.

Rodolph (or RUDOLF) **II.**, Emperor of Gemany, son of Maximilian II., was born at Vienna 1552. He was elected emperor 1576, having already been crowned king of Hungary and Bohemia. He was a weak ruler, neglected state affairs, and, being a rigid R. Catholic, adopted severe measures against his Protestant subjects. War with the Turks broke out, and discontent everywhere prevailed. In 1607 his brother Mathias was elected king of Hungary, and in 1611 Rodolph was compelled to cede the crown of Bohemia also to his brother. He died in 1612, and was succeeded by Mathias.

Rodos'to, a town of Turkey in Europe, on the north shore of the Sea of Marmora, with some handsome streets, large caravanseries, and public baths. The environs are covered with vineyards, producing an excellent wine. Pop. about 20,000.

Rodriguez (rod-rē'gez), an island in the Indian Ocean, 344 miles east of Mauritius, of which British colony it is a dependency; area about 100 square miles. The climate is healthy, but there are frequent hurricanes. The soil is very fertile. Exports include maize, beans, cattle, fish, poultry, and fruit. Rodriguez was annexed in 1810. Pop. 2500.

Roebuck, ROE-DEER (*Capreŏlus caprœa*), a European deer of small size, the adult measuring about 2 feet at the shoulders. The horns or antlers are small, and provided with three short branches only. The general body-colour is brown, whitish beneath. These animals inhabit mountainous and wooded districts. When irritated or alarmed they may prove very dangerous adversaries, and are able to inflict severe wounds with their antlers.

Roebuck, JOHN ARTHUR, English politician, was born at Madras in 1802, died 1879. He was called to the bar in 1832, and became a queen's counsel in 1843. In the reformed parliament of 1832 he was returned for Bath as an advanced Liberal. He lost his seat in 1837, regained it in 1841, only to lose it again in 1847. Sheffield returned him in 1849, and he represented that city for twenty years. He defended the Crimean war, and it was by his motion to appoint a committee to inquire into the condition of the army before Sebastopol that the Aberdeen ministry was overthrown. His denunciation of trades-unions lost him his seat in 1868, but he regained it in 1874. He gave his support to the Eastern policy of Lord Beaconsfield. In 1878 he was nominated a member of the privy-council.

Roermond (rör'mond), a town of Holland, prov. Limburg, at the confluence of the Roer and Maas, 28 miles north by east of Maestricht. It is well built, has a large and beautiful parish church; an old abbey church, the Munsterkerk, built in the 13th century, &c. Pop. 10,470.

Roeskilde (*reu'*skil-de), a seaport of Denmark, in the Island of Zealand, 18 miles west of Copenhagen, formerly among the most important towns of Denmark. It contains a beautiful cathedral, built in 1047. Pop. 5893.

Roestone, a variety of oolite composed of small rounded particles like fish roe.

Rogation Days (Lat. *rogatio*, a request), the Monday, Tuesday, and Wednesday before Holy Thursday or Ascension Day, so called from the supplications or litanies which are appointed in the Roman Catholic church to be sung or recited in public procession by the clergy and people. In England, after the Reformation, this practice was discontinued, but it survives in the custom (observed in some places) of perambulating the parish boundaries.

Roger I., Count of Sicily, one of the numerous sons of Tancred de Hauteville, a Norman baron in France, was born about 1031. He joined his brother Robert Guiscard in Apulia in 1057, and assisted him to found the Kingdom of the Two Sicilies. He captured Messina in 1061, Palermo was reduced in 1072, and Agrigentum in 1087, the conquest of the island being thus completed. Upon the death of Robert in 1085 Southern Italy as well as Sicily came into Roger's hands. He died in 1101.

Roger II., King of Sicily, second son of the above, at his father's death was only five years of age. When he came of age Roger executed his task of governing Sicily with great ability and courage, and his sway was gradually extended over a great part of S. Italy. By the antipope Anacletus in 1130 he was honoured with the title of king. In spite of repeated revolts of the barons, and although the German emperor Lothair and the Greek emperor Emmanuel were leagued against him, and Innocent II. excommunicated him, he defended himself with success and defeated the pope's forces at Galluzzo, taking Innocent prisoner. Peace was made, the pope annulled all excommunication against Roger, and recognized his title of king. Roger afterwards fought with success against the Greeks, took Corfu, and gained part of the north coast of Africa. He died in 1154, and was succeeded by a son and a grandson.

Roger de Hoveden. See *Hoveden* (*Roger de*).

Roger of Wendover, an early English chronicler, of whom little is known, except that he was a monk of St. Albans, afterwards prior of Belvoir, and died at St. Albans' Abbey, May 6, 1237. He was the writer of the work entitled Flores Historiarum (Flowers of Histories). An English translation forms 2 vols. of Bohn's series.

Rogers, Samuel, English poet, born at Stoke-Newington, London, July 30, 1763; died 18th Dec. 1855. His father was a leading member of a Dissenting congregation, and a banker by profession. After completing his attendance at school, young Rogers entered the banking establishment as a clerk, but his favourite pursuits were poetry and literature. His first appearance before the public was in 1786, when he gave to the world his Ode to Superstition, and other Poems. The Pleasures of Memory, with which his name is principally identified, appeared in 1792, and An Epistle to a Friend (1798). In 1812 he published The Voyage of Columbus, a fragment; in 1814, Jacqueline, a tale; in 1819, Human Life; and in 1822, Italy, a descriptive poem in blank verse. He was, until within a few years of his death, a man of extremely active habits, and his benevolence was exerted to a large extent on behalf of suffering or friendless talent. He formed a remarkable collection of works of art, &c., and issued sumptuous editions of his own works, with engravings on steel from drawings by Turner and Stothard. A volume of his Table Talk was published by his friend Alexander Dyce (London, 1856).

Rog'geveld Mountains, a range in the south-western division of Cape Colony, running N.W. to S.E. with an average height of 5000 feet.

Rogue, in law, a vagrant or vagabond. Persons of this character were, by the ancient laws of England, to be punished by whipping and having the ear bored with a hot iron. The term *rogues and vagabonds* is given to various definite classes of persons, such as fortune-tellers, persons collecting alms under false pretences, persons deserting their families and leaving them chargeable to the parish, persons wandering about as vagrants without visible means of subsistence, persons found on any premises for an unlawful purpose, and others. Rogues and vagabonds may be summarily committed to prison for three months with hard labour. See *Vagrant*.

Rohan (rō-äṅ), Henri, Duke of, French Protestant leader, born in 1579. In his sixteenth year he joined the court of Henry IV., and after the death of the latter in 1610 became chief of the Huguenots. After the fall of Rochelle (1628), and the peace of 1629, Rohan withdrew from France, and in exile wrote his Mémoires sur les Choses advenues en France depuis la Mort de Henri IV. (Paris, 1630). He commanded the Venetian troops against Austria until the peace of Cherasco in 1631. In 1638 he joined the Protestant army on the Rhine, and died of wounds received at the battle of Rheinfelden on 13th April, 1639. He was the author of Mémoires sur la Guerre de la Valteline (1638), Les Intérêts des Princes (1649), and Discours Politiques (1693).

Rohan, Louis René Edouard, Prince de, Cardinal-bishop of Strasburg, was born in 1734 at Paris. In 1772 he went as ambassador to the court of Vienna. He derives his notoriety, however, chiefly from

the affair of the necklace. (See *La Motte.*) He was then grand almoner of France, and being thrown into the Bastille, continued in prison more than a year, when he was acquitted and released by the parliament of Paris, August, 1786. He died in Germany in 1803.

Rohilkhand, or ROHILCUND, a division of British India, N. W. Provinces; area, 10,885 square miles; pop. 5,343,674. The surface is a plain, with a gradual slope south, in which direction its principal streams, the Ramganga, Deoha, and others, flow to the Ganges. It takes its name from the Rohillas, an Afghan tribe, who gained possession of it early in the 18th century. It is subdivided into the districts Bijnur, Muradabad, Budaon, Bareli, Pilibhit, and Shahjahanpur. It incloses the native principality of Rampur.

Rohlfs (rōlfs), FRIEDRICH GERHARD, a celebrated African traveller, born in 1831 at Vegesack, Germany. He studied medicine, and in 1855–60 he served with the French in Algiers as surgeon in the foreign legion. In 1860 he travelled through Morocco dressed as a Mussulman, and explored the Tafilet Oasis in 1862. In 1863, and again in 1865, he travelled in North Africa, making his way on the latter occasion from Tripoli to Lake Tchad, Bornu, &c., and finally to Lagos on the west coast. He joined the English Abyssinian expedition in 1867. In 1868 he travelled in Cyrenaica, and in 1873–74 he conducted an expedition through the Libyan Desert. He travelled across North America in 1875–76, and in 1878 he undertook a new journey to Africa, and penetrated to the Kufra Oasis. In 1880 he visited Abyssinia. He was appointed German general-consul at Zanzibar in 1884, returned in 1885, and died in 1896. His works include, among others: Journey through Morocco (1869), Land and People of Africa (1870), Across Africa (1874–75) Journey from Tripoli to the Kufra Oasis (1881), My Mission to Abyssinia (1883).

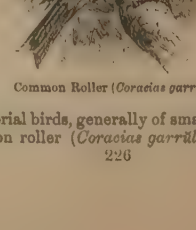
Rohri (rō-rē), a town of India, Shikárpur District, Sind, Bombay, on west bank of the Indus, and a station on the Northwestern State Railway. Pop. 10,224.

Rohtak, a town of India, capital of a district of the same name in the Punjab, 42 miles N.W. of Delhi. Pop. 16,702.—The district has an area of 1811 square miles, forming almost one unbroken well-cultivated plain. Pop. 598,475.

Roland, or ORLANDO, a celebrated hero of the romances of chivalry, and one of the paladins of Charlemagne, of whom he is represented as the nephew. His character is that of a brave, unsuspicious, and loyal warrior, but somewhat simple in his disposition. According to the Song of Roland, an old French epic, he was killed at the battle of Roncesvalles after a desperate struggle with the Saracens, who had attacked Charlemagne's rear-guard. The celebrated romantic epics of Boiardo (Orlando Innamorato) and Ariosto (Orlando Furioso) relate to Roland and his exploits.

Roland de la Platière (ro-lăn dė là plåt-yār), JEAN MARIE, French author and statesman, born 1734. Previous to the revolution he was engaged in manufactures, but being sent to Paris by the city of Lyons, on official business, he became connected with Brissot and other popular leaders, through whose influence he was appointed minister of the interior in 1792. He was dismissed by the king after a few months; but on the fall of Louis he was recalled to the ministry. After the proscription of the Girondists he was arrested, and on receiving news of the death of his wife he killed himself. Roland was author of a Dictionary of Manufactures, and of other works. His wife, MARIE JEANNE PHLIPON, was born at Paris in 1754. After her marriage in 1779 she took part in the studies and tasks of her husband, and accompanied him to Switzerland and England. On the appointment of her husband to the ministry she participated in his official duties, and took a share in the political councils of the leaders of the Girondist party. On the fall of her husband she was arrested, and was executed Nov. 8, 1793. Her Mémoires and Letters have been published.

Roller (*Coracias*), a genus of fissirostral



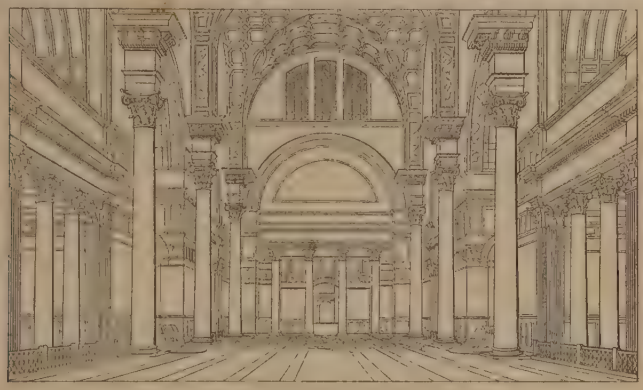
Common Roller (*Coracias garrula*).

insessorial birds, generally of small size. The common roller (*Coracias garrula*) is found

in Europe as a summer visitor, but only occasionally visits Great Britain. Africa appears to be its native country. In size the roller averages the common jay. The plumage is in general an assemblage of blue and green, mixed with white, and heightened by the contrast of more sombre colours. The voice is noisy and harsh. The food consists of insects, small reptiles, and fruit.

Rollin (rol-aṇ), CHARLES, a French historian, born at Paris in 1661, studied theology, obtained a chair in the Collége de France, and latterly was a rector of the University of Paris. He died in 1741. His Ancient History was long popular in English, but is now quite out of date.

Rolling-mill, a combination of machinery used in the manufacture of malleable iron and other metals of the same nature. It consists of one or more pairs of iron rollers, whose surfaces are made to revolve nearly in contact with each other, while the heated



Roman Architecture.—Great Hall in the Baths of Caracalla.

metal is passed between them, and thereby subjected to a strong pressure. The first rolling is to expel the scoriæ and other impurities, after which the mass of metal is cut into suitable lengths, which are piled on one another and reheated, when the mass which has been partially fused is again passed through the rollers. This second rolling determines its form into a hoop, rail, bar, or plate according to the form given to the surfaces of the rollers. See *Iron*.

Rolls, MASTER OF THE. See *Master of the Rolls*.

Rolls Series, the series of English publications issuing from the Record Office under the control of the master of the rolls. It comprises most of the chief English chronicles and many highly important historical documents.

Romagna (rō-màn'yà), formerly the north-eastern portion of the Papal States, embracing the provinces of Ferrara, Bologna, Ravenna, and Forlì.

Romaic. See *Greece* (*Modern*).

Roman Architecture, the style of building practised by the ancient Romans. Derived on the one hand from the Etruscans, and on the other from the Greeks, the fusion ultimately resulted in an independent style. Its essential characteristics are, the employment of the Tuscan and the Composite order, and the introduction and free use of the semicircular arch and arcade, together with the use of rounded and prominent mouldings, often profusely decorated. In Roman architecture the great feature is the employment of the arch as well as the lintel, while Greek architecture employs the lintel only. It produced various constructions, unknown to Greek art, such as amphitheatres, circuses, aqueducts, bridges, baths, triumphal arches, &c. It has thus been of vastly greater practical utility than the Greek, and is bold and imposing in appearance. The column as a support, being no longer exclusively a necessity, was often of

a purely decorative character, and was largely used in front of closed walls, in domes above circular interiors, and in the construction of cylindrical and groined vaulting over oblong spaces. The arch was freely used internally as well as externally, and became an important decorative feature of interiors. The Roman temples, as a rule, from the similarity of the theogony to that of the Greeks, were disposed after the Greek form, but a purely Roman type is seen in the circular temples such as the Pantheon at Rome, the temple of the Sibyl at Tivoli, the temple of Vesta at Rome, &c. This style of architecture was introduced by the Romans into all their colonies and provinces —vast existing remains evidencing the solid character of the buildings. It reached its highest stage during the reign of Augustus (B.C. 27), and after the translation of the seat of empire to Byzantium it degenerated and ultimately gave place to a debased style.

Roman Candle, a kind of firework consisting of a tube which discharges in rapid succession a series of white or coloured stars or balls.

Roman Catholic Church, that society of Christians which acknowledges the Bishop of Rome as its visible head. The foundation of the Christian church at Rome is uncertain, but St. Paul did not visit Rome until after he had written his Epistle to the Romans. The claim to supremacy on the part of the Bishop of Rome is based on the belief that our Lord conferred on Peter a primacy of jurisdiction; that that apostle fixed his see at Rome; and that the bishops of Rome, in unbroken succession from Peter, have succeeded to his prerogative of supremacy. The distinctive character of the Roman Church is the supremacy of the papacy. Its doctrines are to be found in the Apostles' creed, the Nicene creed, the Athanasian, and that of Pius IV. The latter added the articles on transubstantiation, invocation of saints, and others which chiefly distinguish the Roman from other Christian communities. The dogmas of the immaculate conception of the Virgin Mary and papal infallibility are recent additions. Roman Catholics believe that the mass is the mystical sacrifice of the body and blood of Christ, that the body and blood are really present in the eucharist, and that under either kind Christ is received whole and entire. They also believe in purgatory, that the Virgin Mary and the saints are to be honoured and invoked, and that honour and veneration are to be given to their images. Seven sacraments are recognized, viz.: Baptism, confirmation, the holy eucharist, penance, extreme unction, holy orders, and matrimony. A hard-and-fast line in matters relating to the faith is drawn between what is of doctrine and what of discipline. Doctrine is what was taught by Christ and his disciples; discipline, different rules, laid down by the councils, for the government of the church, the administration of sacraments, and the observances and practices of religion. Fasting and confession form part of the discipline. The clergy of the church in the west are bound by a vow of celibacy implied in their ordination as sub-deacons. The clergy of those Greek and Armenian Churches that are united in communion with the see of Rome, may receive orders if married, but may not marry after ordination. Under the generic name of Roman Catholics are comprised all churches which recognize the supremacy of the Pope of Rome, including the United Greeks, Slavonians, Ruthenians, Syrians, Copts, and Armenians. The supreme council or senate of the Roman Church is the college of cardinals, 70 in number, who are the advisers of the sovereign, and, on the death of the pontiff, elect his successor. The total number of members of the Roman Catholic Church has been estimated at 229,000,000, about 5,350,000 being in Great Britain and Ireland. In England and Wales there are 1446 chapels and stations with 2628 priests; in Ireland, 2350 places of worship and 3157 priests; in Scotland, 386 churches and 343 priests. The number of Roman Catholics in the United States is about 7,500,000, with 3000 places of worship. In Canada the members of the Roman Catholic Church number 2,200,000, with 2200 churches and chapels. See also such articles as *Catholic Emancipation, Conception* (*Immaculate*), *Infallibility, Mass, Orders* (*Religious*), *Popes, Papal States, Saints*, &c.

Roman Catholic Emancipation. See *Catholic Emancipation.*

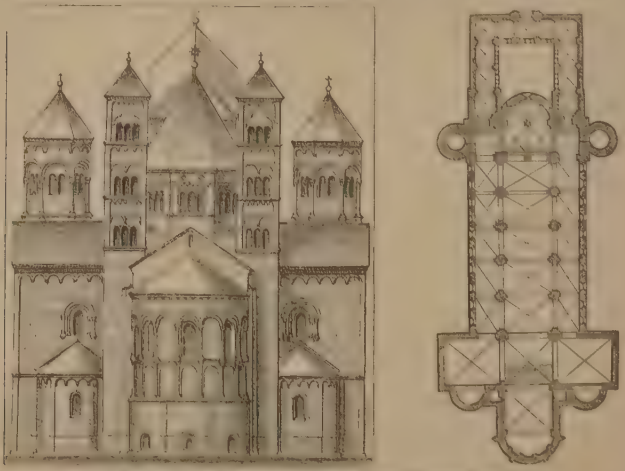
Romance, a fictitious narrative in prose or verse, the interest of which turns upon incidents either marvellous or uncommon. The name is derived from the class of languages in which such narratives in modern times were first widely known and circulated: these were the French, Italian, and Spanish, called the *Romance Languages* (which see). (For the distinction between

romance and *novel* see the article *Novel.*) The earlier mediæval romances of Western Europe were metrical, and may be divided into two classes—the popular epics chanted by strolling minstrels, and the more elaborate and artificial poems composed and sung by the court poets. Both classes were based on more ancient lays treating of celebrated heroes, frequently mingled with pagan myths, and with connecting passages composed by the reciters. Hence originated a series of epics grouped around some renowned hero, and forming a cycle of romance. The romances of French origin (*chansons de geste*) form a large and interesting body of literature. Some of them reach a greater length than 20,000 lines. These romances were sung by wandering minstrels (*jongleurs*) to the sound of a kind of violin (*vielle*). Many of the reciters wrote their own chansons, whilst others bought copies from the original composers. The chansons de geste are divided into three cycles—that relating to Charlemagne and his peers; the Arthurian, or that concerned with King Arthur and his knights; and the classical, dealing with Troy, Alexander the Great, &c. The oldest is the Chanson de Roland, dating from the 11th century and treating of the deeds of Charlemagne's nephew Roland. Ferabras or Fierabras, dating from the beginning of the 13th century, belongs to the same cycle. Other chansons worthy of mention are: Ogier le Danois, written about the beginning of the 13th century; Renaud de Montauban, composed in the 13th century; Huon de Bordeaux (12th century); Beuves d'Hanstonnes (13th century, our Bevis of Hampton). The romances of the Arthurian cycle owe their origin to the lays of the Welsh bards, supposed to be as old as the 6th and 7th centuries, but they are directly based on the Latin History of Geoffrey of Monmouth, which was versified in French by Wace (1155–58) and amplified and translated into English by Layamon about 1204. One of the most prolific of Arthurian poets is Chrétien de Troyes (born about 1140). His poem Li Chevalier au Lyon is the Ywain and Gawain in Ritson's English Metrical Romances. Another poem belonging to this cycle is the Morte Arthur (14th century). The Arthurian romance spread from France to Provence, Spain, Italy, and the Netherlands, and was again transplanted into England. The most important romance of the classical cycle is Le Romans d'Alixandre, written by Lambert li Tors and Alixander de Bernay in the 12th century; it contains upwards of 20,000 twelve-syllable lines. This chanson first brought the Alexandrine line into vogue and gave it its name. The English Kyng Alisaunder, in 8034 eight-syllable lines, dates from the 14th century. The chief poem of the Trojan section is the Troie of Benoist de St. More, an Anglo-Norman poet of the 12th century. This chronicle consists of upwards of 30,000 octo-syllabics, and was translated into Dutch and German verse in the 13th century. Founded upon it was the Latin Historia Trojana of Guido de Colonna, which was translated into most European languages. It was turned into English and Scotch verse no fewer than four times. The most celebrated of these is Lydgate's Troye-Boke (1414–20). Besides the romances dealing with the subjects mentioned, we find also a class in which exploits of Teutonic heroes are celebrated, as the Anglo-Saxon or Anglo-Danish Beowulf, the old German Nibelungenlied, the romance of Havelok the Dane, &c. The poetical romance was superseded by the prose romance, the transformation of metrical into prose romances being partly due to the invention of the art of printing, by which the advantage of metre for purposes of recital was superseded. The prose narratives, like those in verse, celebrated Arthur, Charlemagne, Amadis de Gaul, and other heroes of chivalry.

Romance Languages, those languages of S. Europe which owe their origin to the language of Rome—the Latin—and to the spread of Roman dominion and civilization. They include the Italian, French, Provençal, Spanish, Portuguese, Roumanian, and Romansch. Their basis was not, however, the classic Latin of literature, but the popular Roman language—the *Lingua Romana rustica* spoken by the Roman soldiers, colonists, and others, and variously modified by uneducated speakers of the different peoples among whom it became the general means of communication. In all of these tongues Latin is the chief ingredient, and a knowledge of Latin helps very greatly in acquiring a knowledge of them.

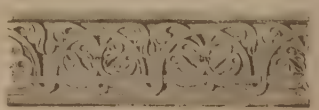
Roman Cement, a dark-coloured hydraulic cement, which hardens very quickly and is very durable. The true Roman cement is a compound of pozzuolana and lime ground to an impalpable powder and mixed with water when used. Other cements bearing the same name are made of different ingredients. See *Cements.*

Romanesque Architecture, a general and rather vague term applied to the styles of architecture which prevailed in Western Europe from the 5th to the 12th century. The Romanesque may be separated into two divisions: (*a*) the debased Roman, in use from the 5th to the 8th century; and (*b*) the later Romanesque of the 8th to the 12th century, which comprises the Lombard, Rhenish or German, and Norman styles. The former is characterized by a pretty close imitation of the features of Roman, with changes in the mode of their application and distribution; the latter, while based on Roman form, is Gothic in spirit, has a predominance of vertical lines, and introduces a number of new features and greatly modifies others. To the former belong especially churches of the basilica type (see *Basilica*) in various cities of Italy, as also



End View and Plan of Romanesque Church of Laach (Rhenish Prussia)

a number of circular churches, and many of these buildings have a certain affinity to the Byzantine type of architecture. (See *Byzantine.*) The semicircular arch is used throughout the entire period, and the general expression of the buildings is rather severe. It assumes different phases in different countries. In Romanesque churches of the 9th and the 11th century the prevailing features are: that in plan the upper limb of the cross is short and terminated by a semicircular or semioctagonal apse; the transepts frequently short, and often rounded externally; the walls very thick, without buttresses or with buttresses having very slight projection; the pillars thick, sometimes simply cylindrical or clustered in large masses, and either plain or with but simple decoration; the capitals of cushion form, sometimes plain, at others enriched with various ornaments peculiar to the style. Externally, roofs of moderate pitch, towers square or octagonal, low or of moderate elevation, and with terminations of pyramidal character; windows round-headed and



Romanesque Ornament.

without mullions; doorways moderately recessed and highly decorated with the cable, chevron, and other distinctive ornaments; arcades much employed for decoration, frequently by a continuous series round the upper part of the apse and round the upper parts of transepts also, when the transepts

are rounded externally. The principal front is frequently flat and decorated with arcades in successive rows from the apex of the roof till just above the portals, producing a rich effect, as at Pisa Cathedral. See *Lombard Architecture* and *Norman Architecture*, and the general article *Architecture*.

Roman Law. See *Civil Law*.

Roman Literature. See *Rome*.

Roman Numerals. See *Arithmetic*.

Romano, GIULIO. See *Giulio Romano*.

Roman Roads, certain ancient roads in Britain which the Romans left behind them. They were uniformly raised above the surface of the neighbouring land and ran in a straight line from station to station. The four great Roman roads were Watling Street, the Fossway, Icknield Street, and Ermine Street. Watling Street probably ran from London to Wroxeter. The Foss ran from Seaton in Devonshire to Lincoln. The Icknield Way ran from Iclingham, near Bury St. Edmunds, to Cirencester and Gloucester. The Ermine Street ran through the Fenland from London to Lincoln. Besides these four great lines, which were long of great importance for traffic, there were many others. For usual plan of Roman roads see *Appian Way*.

Romans (ro-mäṅ), a town of S.E. France, dep. Drôme, 10 miles north-east of Valence, picturesquely situated on the Isère. It has walls flanked with towers, an interesting church, and manufactures of cottons, &c. Pop. 11,923.

Romans, EPISTLE TO THE, the most elaborate, and, in a doctrinal point of view, the most important composition of St. Paul. It sets forth that the gospel doctrine of justification by faith is a power unto salvation to all men, both Jews and Gentiles. The writer then deplores the rejection of the Jews, and in the practical part admonishes the Romans to exercise the various gifts bestowed upon each in a spirit of love and humility; he especially urges the strong to bear with the weak, and concludes with various salutations and directions. In modern times doubts have been thrown upon the authenticity of the concluding portion of this epistle, some critics regarding the whole of chapter xvi. as spurious.

Romansch, RUMONSCH, one of the Romance family of languages, spoken in parts of Switzerland (Grisons), the Tyrol, &c. In some parts it is known as the *Ladin*, that is Latin, which forms the basis of it. The literature is mainly religious.

Romantic, a term used in literature as contradistinguished to *antique* or *classic*. The name *romantic school* was assumed about the beginning of the 19th century by a number of young poets and critics in Germany, the Schlegels, Novalis, Tieck, &c., whose efforts were directed to the overthrow of the artificial rhetoric and unimaginative pedantry of the French school of poetry. The name is also given to a similar school which arose in France between twenty and thirty years later, and which had a long struggle for supremacy with the older *classic school;* Victor Hugo, Lamartine, &c., were the leaders.

Roman Walls, certain walls or ramparts in Britain constructed by the Romans. The most celebrated of these is the wall built by Hadrian (120 A.D.) between the Tyne and the Solway. It was further strengthened by Severus, and hence is often called the wall of Severus. In 139 Lollius Urbicus built a second wall or northern rampart between the Forth and the Clyde, which occupied the same line as the chain of forts built by Agricola (A.D. 80–85). It is known as the wall of Antoninus. These walls formed the northern boundaries of the Roman dominions in Britain, and were built to prevent the incursions of the Picts and Scots. See *Antoninus, Wall of; Severus, Wall of*.

Rome (Latin, ROMA), the most famous state of ancient times, originally comprising little more than the city of Rome (see next article), latterly an empire embracing a great part of Europe, N. Africa, and Western Asia. The origin of Rome is generally assigned to the year 753 B.C., at which time a band of Latins, one of the peoples of Central Italy, founded a small town on the left bank of the Tiber, about 15 miles from the sea, the population being subsequently augmented by the addition of Sabines and Etruscans. The weight of tradition places it beyond doubt that in the earliest period the government of Rome was an elective monarchy, the king being chosen by an assembly of *patres* (fathers) or heads of families who formed the senate. According to tradition these kings were seven in number, their names and traditional reigns being as follow: Romulus, 753–716 B.C.; Numa Pompilius, 715–676; Tullus Hostilius, 674–642; Ancus Martius, 642–618; L. Tarquinius Priscus, 618–578; Servius Tullius, 578–534; and Tarquinius Superbus, 534–509. The last three were of Etruscan origin,

pointing to a temporary supremacy at least of Etruria over Rome.

From the commencement of Roman history the people are found divided into two classes, the *patricians* or aristocracy (a kind of oligarchy), and the *plebeians* or common people, besides a class called *clients*, immediate dependents of the patricians. All political power was in the hands of the patricians. All matters of importance had to be laid before them in their *comitia curiata* or assembly, in which they voted by divisions called *curiæ*. (See *Comitia*.) From and by them also were elected the members of the senate, or council of the elders, as it may be called, which advised the king. By reforms instituted by Servius Tullius the way was at least prepared for altering this state of affairs. He introduced a division of all the people, according to their property, into five *classes*, and these again into *centuries*. With the first or highest class was sometimes reckoned a body called *equites* or horsemen, but these were sometimes regarded as above all the classes. The lowest section of the people, called *proletarii*, were sometimes reckoned as a sixth class, and sometimes as forming part of the fifth. Thus originated a new assembly, the *comitia centuriata*, which included plebeians as well as patricians, though the latter had the great preponderance. The plebeians got also an assembly of their own with certain limited powers, the *comitia tributa*, in which they met by local divisions called tribes.

The last of the kings, Tarquinius Superbus, by his tyrannical government excited the hatred of all classes, and this was raised to the highest pitch by an act of violence perpetrated by his youngest son Sextus. (See *Lucretia*.) The people then rose in rebellion, and abolished for ever the kingly government (509 B.C.). Upon the expulsion of the kings the royal power was intrusted to one man who held it for a year, and was called *dictator*. Afterwards two yearly officers, called at first *prætors*, afterwards *consuls*, wielded the highest executive power in the state both in civil and military affairs.

Almost all political power still remained with the patricians, however, and for more than 200 years the internal history of Rome is mainly composed of the endeavours of the plebeians to place themselves on an equality with the patricians. In 494 B.C. the plebeians succeeded in securing a measure of justice. Two magistrates called *tribunes* were chosen from the ranks of the plebeians. Their persons were inviolable; and they had the right of protecting every plebeian against injustice on the part of an official. Later they were admitted to the senate, where they had the right of vetoing resolutions and preventing them from becoming law. Their number was afterwards increased to five, and finally to ten. The tribunes, through ignorance of the laws, which were kept secret by the patricians, were often thwarted in their endeavours to aid the plebeians. The plebs demanded the publication of the laws, and at last the senate yielded. It was agreed that in place of the regular magistrates ten men (*decemviri*) should be nominated, with unlimited power to govern the state and prepare a code of written laws. These men entered on office in 451 B.C., and in the first year of office they had compiled ten tables of laws, and to these in the second year they added other two tables, making up the famous Laws of the Twelve Tables. But when the second year had elapsed, and the object for which they had been appointed was accomplished, they refused to lay down their office, and were only forced to do so by an insurrection. The immediate occasion of this rising was, according to the well-known story made popular by Macaulay in his lay of Virginia, an act of infamy attempted by one of the ten. (See *Appius Claudius*.) After the overthrow of the decemvirate two chief magistrates were reappointed, but the title was now changed from prætors to consuls (449 B.C.). In 444 another change was made by the appointment of military tribunes with consular power (from three to six or even eight in number), who might take the place of the consuls. To this office both classes of the community were eligible, although it was not till 400 B.C. that a plebeian was actually elected. In 443 B.C. a new patrician office, that of *censor*, was created. (See *Censor*.) No plebeian was censor till 351 B.C.

During this period of internal conflict Rome was engaged in defensive wars chiefly with the Æquians and Volscians, who lived close by. With these wars are connected the legends and traditions of Coriolanus, the extermination of the Fabii, and the saving of the Roman army by Cincinnatus. (See *Coriolanus*, *Fabii*, and *Cincinnatus*.) Towards the end of the 5th century B.C., after extending her territory to the south, Rome turned her arms against Etruria in the north. For ten years (405–396) the important city of Veii is said to have been besieged, till in the latter

year it was taken by Camillus, and the capture of this city was followed by the submission of all the other towns in the south of Etruria. But just at this point Rome was thrown back again by a total defeat and rout on the banks of the Allia, a small stream about 11 miles N. of Rome, and the capture and destruction of the city by the Gauls in 390 B.C. After the Gauls retired with their booty the city was hastily reconstructed, but the destitution and suffering of the people rendered domestic tranquillity impossible. After a struggle, however, the Licinian laws were adopted in 367, the plebeians being now admitted to the consulship, and a fairer distribution of public lands being brought about.

During the period 343 – 264 Rome was engaged in many important wars, the chief of which were the four Samnite wars, the great Latin war, the war with the Greek cities of S. Italy, and the war with Pyrrhus, the invader of Italy from Greece. The chief events of this protracted struggle were the defeat of the Romans by the Samnites under Pontius at the Caudine Forks, and the passing of the Romans under the yoke in acknowledgment of their subjugation (321 B.C.); the defeat of the Samnites, Umbrians, Etruscans, and Gauls at Sentinum (295 B.C.); and the final defeat of Pyrrhus at Beneventum (275 B.C.). In 272 B.C. the city and fortress of Tarentum surrendered to the Romans, and the defeat of the Sallentini in Calabria (266) made the Romans masters of all Italy south of the Rubicon and Macra.

Rome, having had leisure to conquer Italy, now felt at liberty to contend for the possession of Sicily, at this time almost entirely under the dominion of the great maritime power of Carthage. An opportunity for interfering in Sicilian affairs was easily found, and in 264 B.C. the First Punic or Carthaginian war began. It lasted for more than twenty years, caused the loss of three large fleets to the Romans, and the defeat of a Roman army under Regulus in Africa; but in 241 a great victory over the Carthaginian fleet caused the latter power to sue for peace. This was finally concluded on the conditions that Carthage gave up Sicily, and paid a great sum as a war indemnity. The larger western part of Sicily became the *first Roman province;* the smaller eastern part continued under the supremacy of the Greek city Syracuse, which was allied to Rome. The sway of Rome was also extended over all the islands which Carthage had possessed in the Mediterranean. About the same time the Romans wrested the island of Corcyra (Corfu) and some coast towns from the piratical Illyrians. From 226 to 222 B.C. they were engaged in a more difficult war with Gauls inhabiting the Po basin; but the Romans were again successful, and the Gallic territory was reduced to a Roman province under the name of Gallia Cisalpina (Gaul on this side the Alps).

Meanwhile the Carthaginians had been making considerable conquests in Spain, which awakened the alarm and envy of the Romans, and induced them to enter into a defensive alliance with the Greek colony of Saguntum, near the east coast of that country. In 221 B.C. Hannibal, the son of Hamilcar Barca, who had bravely and skilfully maintained the Carthaginian arms in Sicily, and had since founded and in great part established the Carthaginian empire in Spain, succeeded to the command of the Carthaginian forces. The taking of Saguntum, a city allied to Rome, occasioned the Second Punic war, during which Hannibal traversed Gaul, crossed the Alps, and invaded Italy. The war lasted for sixteen years (218–202 B.C.); and was carried on with consummate generalship on the part of Hannibal, who inflicted on the Romans one of the most disastrous defeats they ever sustained, at Cannæ, in 216 B.C. This great man was ill supported by his country, and the war terminated in favour of the Romans through the defeat of Hannibal by P. Cornelius Scipio at Zama in Africa in 202 B.C. (See *Hannibal.*) One of the results was that the power of Carthage was broken and Spain practically became a Roman possession. Upper Italy was also again subjugated, and Transpadane Gaul acquired. A third Punic war broke out on slight pretext in 149 B.C., and ended in 146 in the capture of Carthage by Scipio (the younger) after a severe struggle, and the conversion of the Carthaginian territory into the province of Africa.

Philip V. of Macedonia had favoured Hannibal, and so gave Rome a pretext to mix in Grecian affairs. The result was that Macedonia was made a Roman province (148 B.C.), while in the same year that Carthage fell Corinth was sacked, and soon after Greece was organized into the province of Achaia. (See *Greece.*) Previously Antiochus the Great of Syria had been defeated by the Romans (190 B.C.) and part of Asia Minor brought into vassalage to Rome. In the east Rome intrigued where she could, and fought when she was compelled, and by dis-

organizing states made them first her dependencies and then her provinces. In 130 B.C. she received by bequest the dominions of Attalus III. of Pergamus (Mysia, Lydia, Caria, and Phrygia), which was formed into the province of Asia.

By this time within Rome strife between different classes again began to be bitter, but it was now not between patricians and plebeians, but between rich and poor. The conquests which had been made, and the lucrative posts which were now to be had, as well as the wide field generally available for money-making, had produced a wealthy privileged class partly consisting of patricians, partly of plebeians, without benefiting the other classes of the citizens. The agrarian laws which formerly protected the people were generally unobserved, great landed estates were accumulated in few hands, and the cultivation of the land by swarms of slaves left war the only occupation of the citizens. Thus vast numbers of the middle class of citizens were reduced to absolute want, and driven from their homes. To remedy this the two Gracchi, Tiberius and Caius, successively proposed measures for the better distribution of the land, and in general for the relief of the destitute classes. They thus incurred the violent hatred of the nobles or men of position, and both of them lost their lives in the party struggles that ensued (in 133 and 121 B.C. respectively).

Previously to this the Romans had formed an alliance with the Greek colony of Massilia (Marseilles), and in aid of their allies they were twice called in to quell the neighbouring Gallic tribes (first in 154 B.C., and next in 125 B.C.). On the second occasion, after putting down the Gauls (125–123) they kept possession of the conquered country, and made this part of Gaul a Roman province (Provincia Gallia—Provence). The next war was in Africa, with Jugurtha, who had usurped the throne of Numidia, and against whom the assistance of Rome had been asked. It was brought to an end by Caius Marius, who had risen from an obscure rank to the consulship (104 B.C.). Marius also repelled invasions of the province of Gaul by the Cimbri and Teutones in 102–101 B.C. A serious war, almost of the nature of a civil war, followed with the Roman allies in Italy, who rose in 90 B.C. to demand the right of equal citizenship with the people of Rome. This war, known as the Social war, lasted for two years (90–88 B.C.), and ended in the victory of the Romans, who, however, found it advisable to concede the franchise to the Italian tribes to prevent another rising.

The war had been concluded by Sulla, between whom and Marius great rivalry prevailed; and now sprang up the first Roman civil war, a struggle between the party of Marius (the people) and that of Sulla (the nobles). Sulla, the consul for 88, was on the point of starting for Asia to attack Mithridates, king of Pontus, a war that promised both glory and treasure. Marius was eager for the same command, and through intrigue on his behalf the populace deprived Sulla of the chief command and gave it to Marius. Thereupon Sulla marched on Rome with his legions, forced Marius to flee to Africa, and then proceeded to the Mithridatic war. In his absence Marius returned, wreaked a bloody vengeance on the partisans of his rival, and died after being appointed consul for the seventh time (86 B.C.). Three years later Sulla came back from Asia, having brought the Mithridatic war to a satisfactory conclusion, and now felt himself at liberty to take his revenge on the Marian party for the atrocities it had been guilty of towards his own party in his absence; and he took it in full measure. Four thousand of his opponents he caused to be massacred in the circus in one day; and then got rid of all the chief men of the democratic party by proscription. He was now appointed dictator for an unlimited term (81 B.C.), and as such passed a series of measures the general object of which was to restore to the constitution its former aristocratic or oligarchical character. In the beginning of 79 B.C. Sulla retired into private life, and he died the year following.

The man who now came most prominently before the public eye was Pompey, one of Sulla's generals. His first important achievement was the subjugation of the remnant of the democratic or Marian party that had gathered round Sertorius in Spain (76–72 B.C.). On his return to Italy he extinguished all that remained of an insurrection of slaves, already crushed by Crassus (71), and in 70 B.C. was consul along with Crassus. In 67 B.C. he drove the pirates from the Mediterranean, and afterwards reduced Cilicia, which he made into a Roman province. He was then appointed to continue the war that had been renewed against Mithridates, king of Pontus, whom he finally subdued,

forming part of his dominions in Asia Minor into a Roman province, and distributing the rest among kings who were the vassals of Rome. In 64 B.C. Pompey put an end to the dynasty of the Seleucidæ in Syria, and converted their kingdom into a province, and in 63 B.C. advanced southwards into Judea, which he made tributary to Rome. All these arrangements were made by him of his own authority. In the very year in which they were completed a member of the aristocratic party, the great orator Cicero, had earned great distinction by detecting and frustrating the Catilinarian conspiracy. (See *Catiline.*)

Only three years after these events (60 B.C.) a union took place at Rome of great importance in the history immediately subsequent. Caius Julius Cæsar, a man of aristocratic family who had attached himself to the democratic party and had become very popular, joined Pompey and Crassus in what is called the *first triumvirate*, and practically the three took the government of Rome into their own hands. On the part of Cæsar, who was now elected consul, this was the first step in a career which culminated in the overthrow of the republic, and his own elevation to the position of sovereign of the empire. After the death of Crassus (53 B.C.) came the struggle for supreme power between Cæsar and Pompey. Cæsar had gained great glory by the conquest of Gaul, but now at Pompey's instigation was called on to resign his command and disband his army. Upon this he entered Italy, drove Pompey into Greece, and the short civil war of 49–48 B.C., and the great battle of Pharsalia in the latter year, decided the struggle in Cæsar's favour. Pompey's army was utterly routed; he himself was compelled to flee, and having gone to Egypt was there murdered. In a short time Cæsar utterly subdued the remains of the Pompeian party and became virtually king in Rome. Cæsar was assassinated in 44 B.C., and the main result of the conspiracy by which he fell was that the first place in Rome had again to be contested. The competitors this time were Octavianus, the grand-nephew and adopted son of Cæsar, then only nineteen, and Mark Antony, one of Cæsar's generals. In 43 B.C. these two formed with Lepidus what is known as the *second triumvirate;* and after avenging the death of Cæsar and putting an end to the republican party in the battle of Philippi (42), Octavian and Antony, casting off Lepidus, who was a weakling, divided the empire between them, the former taking Rome and the West and the latter the East. In ten years war broke out between the two, and in the naval battle of Actium (31 B.C.) Antony was defeated, and the whole Roman world lay at the feet of the conqueror, Egypt being also now incorporated. Not long after this Octavian received the title of Augustus, the name by which he is known in history as the first of the Roman emperors.

In his administration of the empire Augustus acted with great judgment, ostensibly adhering to most of the republican forms of government, though he contrived in course of time to obtain for himself all the offices of highest authority. The reign of Augustus is chiefly remarkable as the golden age of Roman literature, but it was a reign also of conquest and territorial acquisition. Before the annexation of Egypt Pannonia had been added to the Roman dominions (35 B.C.), and by the subsequent conquest of Mœsia, Noricum, Rhætia, and Vindelicia, the Roman frontier was extended to the Danube along its whole course. Gaul and Spain also were now finally and completely subdued. The empire of Augustus thus stretched from the Atlantic to the Euphrates, and from the Rhine and the Danube to the deserts of Africa. This emperor died in 14 A.D. His reign is above all memorable for the birth of Christ in B.C. 4.

Augustus was followed by a series of emperors forming, when he and Julius Cæsar are included, the sovereigns known as the *Twelve Cæsars.* The names of his successors and the dates of their deaths are: Tiberius, 37 A.D.; Caligula, 41; Claudius, 54; Nero, 68; Galba, 69; Otho, 69; Vitellius, 69; Vespasian, 79; Titus, 81; and Domitian, 96. Most of these were sensual and bloodthirsty tyrants, Vespasian and his son Titus being the chief exceptions. Vespasian's reign was noted for the taking and destruction of Jerusalem; that of Titus for the destruction of the cities of Pompeii and Herculaneum by an eruption of Vesuvius (A.D. 79). After Titus his tyrannical brother Domitian reigned till his death by assassination in A.D. 96, when an aged senator, Nerva, was proclaimed as his successor.

Nerva's reign was short (96–98) but beneficent, and he was followed by four emperors, Trajan, Hadrian, Antoninus Pius, and Marcus Aurelius, who together reigned for more than eighty years, and under whom the countries making up the Roman Empire enjoyed

in common more good government, peace, and prosperity than ever before or after. Trajan (98–117) was a warlike prince, and added several provinces to the Roman Empire. Hadrian (117–138), the adopted son of Trajan, devoted himself entirely to the internal affairs of his empire. It was in his reign that the southern Roman wall, or rampart between the Tyne and the Solway Firth, was erected. Antoninus Pius (138–161) was likewise the adopted son of his predecessor. In his reign the northern wall in Britain, between the Forth and Clyde, was constructed. The next emperor, Marcus Aurelius (161–180), was both the son-in-law and the adopted son of Antoninus Pius. He combined the qualities of a philosopher with those of an able and energetic ruler.

Commodus (180–192), the son and successor of Aurelius, inherited none of his father's good qualities, and his reign, from which Gibbon dates the decline of the Roman Empire, presents a complete contrast to those of the five preceding emperors. During his reign an era of military despotism ensued. The prætorian guard (the imperial body-guard) became virtually the real sovereigns, while the armies of the provinces declared for their favourite officers, and the throne became the stake of battle. In the long list of emperors who succeeded may be noted Septimius Severus, who reigned from 193 to 211, during which time he restored the empire to its former prestige. He reconquered Mesopotamia from the Parthians, but in Britain he confined the Roman province to the limit of Hadrian's Wall, which he restored. He died at York. Alexander Severus, who reigned from 222 till 235, was also an able ruler, and was also the first emperor who openly extended his protection to the Christians. His death was followed by a period of the greatest confusion, in which numerous emperors, sometimes elected by the senate, sometimes by the soldiers, followed one another at short intervals, or claimed the empire simultaneously. This period is known as the era of the Thirty Tyrants. Meanwhile the empire was ravaged on the east by the Persians, while the German tribes and confederations (Goths, Franks, Alemanni) invaded it on the north. The empire was again consolidated under Aurelian (270–275), who subdued all the other claimants to the imperial dignity, and put an end to the Kingdom of Palmyra, which was governed by the heroic Zenobia.

The reign of Diocletian (284–305) is remarkable as affording the first example of that division of the empire which ultimately led to the formation of the empire of the West and the empire of the East. Finding the number of the barbarian violators of the Roman frontier too great for him he adopted as joint-emperor Maximian; and in 292 each of these associated with himself another, to whom the title of Cæsar was allowed. Diocletian took Galerius, and Maximian his son-in-law Constantius Chlorus. These four now divided the empire between them. Diocletian assumed the government of the East with Thrace, allotting to Galerius the Illyrian provinces; Maximian assumed Italy, Africa, and the islands of the Mediterranean; and left to Constantius Spain, Gaul, and Britain. This arrangement temporarily worked well, but in 323 Constantine, the son of Constantius, was left sole master of the empire.

Ever since the time of Augustus and Tiberius, Christianity had been spreading in the Roman Empire, notwithstanding terrible persecutions. The number of churches and congregations had increased in every city; the old religion (see below) had died out, and very few believed in it; so at last Constantine judged it wise to make the Christian religion the religion of the empire. He also removed the seat of government from Rome to Byzantium, which was hence called Constantinople (330), and completely reorganized the imperial administration. Constantine died in 337. The empire was left among his three sons, of whom Constantius became sole ruler in 353.

The next emperor, Julian the Apostate, sought to restore the old religion, but in vain. He was an able ruler, but fell in battle against the Persians in 363. He was succeeded by Jovian, who reigned less than one year; and after his death (364) the empire was again divided, Valens (364–378) obtaining the eastern portion, and Valentinian (364–375) the western. From this division, which took place in 364, the final separation of the eastern and western empires is often dated. In the reigns of Valens and Valentinian great hordes of Huns streamed into Europe from the steppes of Central Asia. After subduing the eastern Goths (Ostrogoths) they attacked those of the west (Visigoths); but these, since they had already been converted to Christianity, were allowed by Valens to cross from the left to the right bank of the Danube, and settle in Mœsia. In their new homes they found themselves exposed to the oppression and rapacity of the Roman gover-

nors, and when they could no longer brook such treatment they rose in rebellion, and defeated Valens in the sanguinary battle of Adrianople, in the flight from which the emperor lost his life (378). His son Gratianus created the heathen Theodosius co-regent, and intrusted him with the administration of the East. Theodosius became a Christian, fought successfully against the Western Goths, but was obliged to accept them as allies in their abodes in Mœsia and Thrace. In 394 the whole empire was reunited for the last time under Theodosius. After his death (395) the empire was divided between his two sons, Honorius and Arcadius, and the eastern and western sections became permanent divisions of the empire, the latter being now under Honorius. For the further history of the Empire of the East, see *Byzantine Empire.*

In 402 Alaric, king of the Visigoths who were settled on the south of the Danube, was incited to invade Italy, but he was soon forced to withdraw on account of the losses he suffered in battle (403). Scarcely had these enemies retreated when great hosts of heathen Teutonic tribes, Vandals, Burgundians, Suevi, and others, made an irruption into Italy on the north; but these also were overcome by Stilicho, the guardian of the youthful emperor Honorius, in the battle of Fæsulæ (or Florence), and compelled to withdraw (406). The Burgundians now settled in part of Gaul, while the Vandals and Suevi crossed the Pyrenees into Spain. In 408 Alaric marched into Italy, advanced up to the walls of Rome, and ultimately took the city by storm (410). Shortly after Alaric died, and his brother-in-law Athaulf (Adolphus) concluded a treaty with Honorius, and retired into Gaul, where the Visigoths founded in the south-west a kingdom that extended originally from the Garonne to the Ebro (412). About this time also the Romans practically surrendered Britain, by withdrawing their forces from it, and thus leaving it a prey to Teutonic pirates and northern savages. In 429 the Vandals wrested the province of Africa from the empire and set up a Vandalic kingdom in its place. In 452 the Huns left their settlements in immense numbers under their king Attila, destroyed Aquileia, took Milan, Pavia, Verona, and Padua by storm, laid waste the fruitful valley of the Po, and were already advancing on Rome when the Roman bishop, Leo I., succeeded in inducing them to conclude a peace with Valentinian, and withdraw. Soon after their leader Attila died (453), and after that the Huns were no longer formidable. Two years after the death of Attila, Eudoxia, the widow of Valentinian, the successor of Honorius, invited the assistance of the Vandals from Africa, who under their leader Genseric proceeded to Rome, which they took and afterwards plundered for fourteen days, showing so little regard to the works of art it contained as to give to the word vandalism the sense it still expresses (455). They then returned to Africa with their booty and prisoners. After the withdrawal of the Vandals, Avitus, a Gaul, was installed emperor. Under him the Suevian Ricimer, the commander of the foreign mercenaries at Rome, attained such influence as to be able to set up and depose emperors at his pleasure. The last of the so-called Roman emperors was Romulus Augustulus (475–476 A.D.). His election had been secured through the aid of the German troops in the pay of Rome, and these demanded as a reward a third part of the soil of Italy. When this demand was refused, Odoacer, one of the boldest of their leaders, deposed Romulus, to whom he allowed a residence in Lower Italy with a pension, and assumed to himself the title of King of Italy, thus putting an end to the Western Roman Empire, A.D. 476. (See *Italy.*)

Language.—The language of the Romans was the Latin, a language originally spoken in the plain lying south of the Tiber. Like the other ancient Italian dialects (Oscan, Umbrian, &c.) it is a branch of the Indo-European or Aryan family of languages, and is more closely allied to the Greek than to any other member of the family. At first spoken in only a small part of Italy, it spread with the spread of Roman power, till at the advent of Christ it was used throughout the whole empire. The Latin language is one of the highly inflected languages, in this resembling Greek or Sanskrit; but as compared with the former it is a far inferior vehicle of expression, being less flexible, less adapted for forming compound words, and altogether less artistic in character. The earliest stage of Latin is known almost wholly from inscriptions. During the period of its literary development many changes took place in the vocabulary, inflection, word formation, and syntax. In particular, considerable additions to the vocabulary were made from the Greek. At the same time the language gained in refinement and regularity, while it preserved

all its peculiar force and majesty. The most perfect stage of Latin is that represented by Cicero, Horace, and Virgil in the 1st century B.C.; and the classical period of the Latin language ends in the 2d century A.D. The decline may be said to date from the time of Hadrian (117–138). In the 3d century the deterioration of the language proceeded at a very rapid rate. In the 4th and 5th centuries the popular speech, no longer restrained by the influence of a more cultivated language, began to experience that series of transmutations and changes which formed the transition to the Romance languages. Latin, however, still remained, through the influence of the church and the law, the literary language till far on in the middle ages; but it was a Latin largely intermixed with Celtic, Teutonic, and other elements, and is now usually called Late or Low Latin. The study of Latin is of great assistance in acquiring an accurate knowledge of English, as a great part of the English vocabulary is of Latin origin, being either taken from the French or from classical Latin directly.

Literature.—The history of Roman literature naturally divides itself into three periods of Growth, Prime, and Decline. The first period extends from about 250 B.C. to about 80 B.C. The second period ranges from 80 B.C. to the death of Augustus in 14 A.D., and includes the greater part of the Roman literature usually studied in schools and colleges. The period of decline then followed. Poetry in this language, as in all others, preceded prose. The oldest forms of Latin poetry were the Fescennine verses, which were poems of a jocular and satirical nature sung at marriages and country festivals; satires or improvised dialogues of miscellaneous contents and various form; and the Atellanæ fabulæ, a species of grotesque comedy supposed to resemble the modern Punchinello. The first known writer was Livius Andronicus, a Greek freedman taken prisoner at Tarentum (272 B.C.) and afterwards emancipated, who about 240 B.C. exhibited at Rome a drama translated from the Greek, and subsequently brought out a translation of the Odyssey. He was followed by Nævius, who wrote a historical poem on the first Punic war, besides dramas; by the two tragic writers Pacuvius and Accius or Attius; and by Ennius, author of eighteen books of metrical annals of Rome and of numerous tragedies, and regarded by the Romans themselves as the founder of Roman poetry. Mere fragments of these early works alone remain. The founder of Roman comedy was Plautus (254–184 B.C.), who was surpassed for force of comic humour by none of his successors. Next followed Cæcilius; and then Terence (195–159 B.C.), a successful imitator and often mere translator of the Greek dramatist Menander and others, and, although an African by birth, remarkable for the purity and excellence of his Latinity. These three comic writers took the New Comedy of the Greeks as their model (*Comœdia palliata*); and we still possess a number of plays by Plautus and Terence. On the other hand, Afranius, with a few others, introduced Roman manners upon the stage (*Comœdia togata*). Lucilius (148–103 B.C.) was the originator of the Roman poetical satire, the only kind of literary composition among the Romans which was of native origin. Lucretius (B.C. 98–55), a writer full of strength and originality, has left us a philosophical poem inculcating the system of Epicurus, in six books, entitled De Rerum Natura. Catullus (94–54 B.C.) was distinguished in lyric poetry, in elegy, and in epigrams. With the age of Augustus a new spirit appeared in Roman literature. The first of the Augustan poets is Virgil (B.C. 70–19), the greatest of the epic poets of Rome, author of eclogues or pastoral poems; the Georgics, a didactic poem on agriculture, the most finished of his works; besides the long epic poem entitled the Æneid. Contemporary with him was Horace (B.C. 65–8), the favourite of the lyric muse, and also eminent in satire. In the Augustan age Propertius and Tibullus are the principal elegiac poets. Along with these flourished Ovid (B.C. 43–18 A.D.), a prolific and sometimes exquisite, but too often slovenly poet. During the age of Augustus the writing of tragedies appears to have been a fashionable amusement, but the Romans attained no eminence in this branch.

After the death of Augustus the department of poetry in which greatest excellence was reached was satire, and the most distinguished satirists were Persius, and after him Juvenal (flourished about 100 A.D.), both of whom expressed, with unrestrained severity, their indignation at the corruption of the age. In Lucan (A.D. 38–65), who wrote the Pharsalia, a historical epic on the civil war between Cæsar and Pompey; and Statius (flourished about 85 A.D.), who wrote the Thebaid, we find a poetic coldness which vainly endeavours to kindle itself by the

fire of rhetoric. In the epigrams of Martial (about 43–104 A.D.) the whole social life of the times is mirrored with attractive clearness. Valerius Flaccus (about 70–80 A.D.), who described the Argonautic expedition in verse, endeavoured to shine by his learning rather than by his originality and freshness of colouring. Silius Italicus (25–100 A.D.), who selected the second Punic war as the subject of a heroic poem, is merely a historian employing verse instead of prose. To this age belong the ten tragedies under the name of L. Annæus Seneca, the rhetorician. Here also we may mention the Satyricon of Petronius, a contemporary of Nero; for although this work, a kind of comic romance in which the author depicts with wit and vivacity the corruption and bad taste of the age, is written mainly in prose, it is interspersed with numerous pieces of poetry, and cannot be classed with any other prose work belonging to Roman literature. After a long period of poetic lifelessness Claudian (flourished about 400) wrote poems inspired with no little of the spirit and grace of the earlier literature.

In the Roman prose literature, eloquence, history, philosophy, and jurisprudence are the principal departments. Prose composition really began with Cato the Censor (234 B.C.), whose work on agriculture, De Re Rustica, is still extant. Among the great Roman prose writers the first place belongs to Cicero (106–43 B.C.), whose orations, philosophical and other treatises, letters, &c., are very numerous. Varro's Antiquities; Cæsar's Commentaries; the lives of Cornelius Nepos, probably an abridgment of a larger work; and the works of Sallust, are among the more important historical productions down to the Augustan period. Livy the historian (B.C. 59–11 A.D.), author of a voluminous history of Rome, is by far the chief representative of Augustan prose. Under Tiberius we have the inferior historian Velleius Paterculus, the anecdotist Valerius Maximus, and Cornelius Celsus, who has left a valuable treatise on medicine. The most important figure of the period of Nero was Seneca the philosopher, put to death by that tyrant in 65 A.D. His chief works are twelve books of philosophical 'dialogues,' two books on clemency addressed to Nero, seven on investigations of nature, and twenty-two books of moral letters. Quintus Curtius compiled a history of Alexander the Great, and a contemporary writer, Columella (about 50 A.D.), a treatise on agriculture. The leading prose writers of the next period were Pliny the elder, whose Natural History is still extant (23–79 A.D.), a lengthy history and minor treatises being lost; Quintilian (35–118 A.D), who wrote the Institutes of Oratory; and Sextus Julius Frontinus, who has left us treatises on aqueducts and on military devices. In the reigns of Nerva, Trajan, and Hadrian we have two great prose writers—Cornelius Tacitus (about 54–119 A.D.) and Pliny the younger (61–115 A.D.). The former produced a Dialogue on Orators, a life of his father-in-law Agricola, a work on Germany, and two works on Roman history—the Histories and the Annals. The latter, giving the history of the period between the death of Augustus and the death of Nero, is one of the greatest works of the kind in any literature, but unfortunately only a part of it is in existence. Pliny the younger has left ten books of Epistles, and a panegyric in honour of Trajan. C. Suetonius, secretary to Trajan, has left lives of the twelve Cæsars; Cornelius Fronto, the tutor to Marcus Aurelius, a collection of letters, discovered only early in the 19th century; and with the Attic Nights of Aulus Gellius (2d century)—a literary, grammatical, and antiquarian miscellany—the classic Roman prose writers come to a close.

Religion of Ancient Rome.—The ancient religion of the Romans was quite distinct from that of Greece. Though Greek and Etruscan elements were early imported into it, it was, in fact, a common inheritance of the Italians. Towards the end of the republic the theology of Greece was imported into the literature, and to some extent into the state religion. Later on all forms were tolerated. The Roman religion was a polytheism less numerical in deities and with less of the human element in them than that of Greece. The chief deities were Jupiter, the father of gods and men; his wife Juno, the goddess of maternity; Minerva, the goddess of intellect; Mars and Bellona, god and goddess of war; Vesta, the patron of the state, the goddess of the national hearth where the sacred fire was kept burning; Saturnus and Ceres, the god and goddess of agriculture; Ops, the goddess of the harvest and of wealth; Hercules, god of gain, who also presided over contracts; Mercury, the god of traffic; and Neptunus, god of the sea. Venus was originally a goddess of agriculture, but was early identified with the Greek goddess of love, Aphrodite. There were also a host of lesser deities

presiding over private and public affairs; domestic gods, the Lares and Penates, &c. The worship consisted of ceremonies, offerings, prayers, sacrifices, games, &c., to secure the favour, avert the anger, or ascertain the intentions of the gods. In private life the ceremonies were performed in the family; in matters concerning the whole community, by the state. The highest religious power in the state was the *College of Pontifices*, which had control of the calendar, and decided upon the action made necessary by the auguries. The chief of this institution was the *pontifex maximus*. The members of the *College of Augurs* consulted the will of the gods as revealed in omens. The *College of Fetiales* conducted treaties, acted as heralds, and generally superintended the relations between Rome and other states. The officiating priests included the Flamines, who presided in the various temples; the Salii, or dancing priests of Mars; the Vestal Virgins, who had charge of the sacred fire of Vesta; the Luperci, sacred to Pan, the god of the country; the Fratres Arvales, who had charge of boundaries, the division of lands, &c. In addition to their other duties the priests had charge of conducting the various public games, &c.

Rome, the capital of Italy, as formerly of the Roman empire, republic, and kingdom, and long the religious centre of western Christendom, is one of the most ancient and interesting cities of the world. It stands on both sides of the Tiber, about 15 miles from the sea, the river here having a general direction from north to south, but making two nearly equal bends, the upper of which incloses a large alluvial flat, little raised above the level of the stream, and well known by the ancient name of Campus Martius. A large part of the modern city stands on this flat, but the ancient city lay mostly to the east and south-east of this, occupying a series of eminences of small elevation known as the seven hills of Rome (the Capitoline, the Palatine, the Aventine, the Quirinal, the Viminal, the Esquiline, and the Cœlian Hill), while a small portion stood on the other side of the river, embracing an eighth hill (Janiculum). The city is tolerably healthy during most of the year, but in late summer and early autumn malaria prevails to some extent. It has been greatly improved in cleanliness and healthfulness since it became the capital of modern Italy.

Ancient Rome. Topography, &c.—The streets of ancient Rome were crooked and narrow, the city having been rebuilt, after its destruction by the Gauls in 390 B.C., with great haste and without regard to regularity. The dwelling-houses were often very high, those of the poorer classes being in flats, as in modern continental towns. It was greatly improved by Augustus, who extended the limits of the city and embellished it with works of splendour. The Campus Martius during his reign was gradually covered with public buildings, temples, porticoes, theatres, &c. The general character of the city, however, remained much the same till after the fire that took place in Nero's reign, when the new streets were made both wide and straight. In the reign of Augustus the population is believed to have amounted to about 1,300,000, and in that of Trajan was not far short of 2,000,000. Rome is said to have been surrounded by walls at three different times. The first of these was ascribed to Romulus, and inclosed only the original city on the Palatine. The second wall, attributed to Servius Tullius, was 7 miles in circuit, and embraced all the hills that gave to Rome the name of the City of Seven Hills. The third wall is known as that of Aurelian, because it was begun and in great part finished by the emperor of that name. It is mostly the same with the wall that still bounds the city on the left or east bank of the Tiber; but on the right or west bank, the wall of Aurelian only embraced the summit of the Janiculum and a district between it and the river, whereas the more modern wall on that side (that of Urban VIII.) embraces also the Vatican Hill. The wall of Aurelian was about 11 miles in length, that of modern Rome 14 miles. Ancient Rome had eight or nine bridges across the Tiber, of which several still stand. The open spaces in ancient Rome, of which there were a great number, were distinguished into *campi*, areas covered with grass; *fora*, which were paved; and *areæ*, a term applied to open spaces generally, and hence to all those which were neither *campi* nor *fora*, such as the squares in front of palaces and temples. Of the *campi* the most celebrated was the Campus Martius already mentioned, and after it the Campus Esquilinus on the east of the city. Among the latter the Forum Romanum, which lay north-west and south-east, between the Capitoline and Palatine Hills; and the Forum of Trajan, between the Capitoline and Quirinal, are the most worthy of mention.

The first was the most famous and the second the most splendid of them all. The great central street of the city was the Via Sacra (Sacred Way), which began in the space between the Esquiline and Cælian Hills, proceeded thence first south-west, then west, then north-west, skirting the north-east slope of the Palatine, and passing along the north side of the Forum, and terminated at the base of the Capitoline. The two principal roads leading out of Rome were the Via Flaminia (Flaminian Way) or great north road, and the Via Appia (Appian Way) or great south road.

Ancient Buildings.—Ancient Rome was adorned with a vast number of splendid

Circus of Hadrian
Tomb of Hadrian
ST. PETER'S
VATICAN HILL
R. TIBER
MT. PINCIUS
Gardens
Via Salaria
Via Nomentana
Baths of Diocletian
CAMPUS MARTIUS
QUIRINAL HILL
VIMINAL HILL
Wall of Aurelian
Via Tiburtina
RIVER TIBER
CAPITOLINE HILL
PALATINE
AVENTINE HILL
CŒLIAN HILL
Via Aurelia
Via Appia
Via Ostiensis
Via Latina
Via Labicana
Via Prænestina
Via Flaminia
Via Lata
Via Cornelia
Via Triumphalis
Via Recta
Via Sacra
Via Nova
Via Sacra
Via Nova
Via Sacra
Via Nova

Hill, a private dwelling-house enlarged and adopted as the imperial residence by Augustus. Succeeding emperors extended and beautified it. Nero built an immense palace which was burned in the great fire. He began to replace it by another of similar extent, which was not completed till the reign of Domitian. Among the theatres, those of Pompey, Cornelius Balbus, and Marcellus were the most celebrated. That of Pompey, in the Campus Martius, was capable of containing 40,000 persons. Of the Theatre of Marcellus, completed B.C. 13 a portion still remains. The most magnificent of the amphitheatres was that of Titus, completed A.D. 80, now known as the Coliseum or Colosseum (which see). Although only one-third of the gigantic structure remains, the ruins are still stupendous. The principal of the circuses was the *Circus Maximus*, between the Palatine and Aventine, which was capable of containing 260,000 spectators. With slight exception its walls have entirely disappeared, but its form is still distinctly traceable. (See *Circus*.) The porticoes or colonnades, which were public places used for recreation or for the transaction of business, were numerous in the ancient city, as were also the basilicas or public halls. (See *Basilica*.) Among them may be noticed the splendid Basilica Julia, commenced by Cæsar and completed by Augustus; and the Basilica Porcia, which was built by Cato the censor. The public baths or *thermæ* in Rome were also very numerous. The largest were the Thermæ of Titus, part of the substructure of which may still be seen on the Esquiline Hill; the Thermæ of Caracalla, even larger, extensive remains of which still exist in the south-east of the city; and the Thermæ of Diocletian, the largest and most magnificent of all, part of which is converted into a church. Of the triumphal arches the most celebrated are those of Titus (A.D. 81), Severus (A.D. 203), and that of Constantine (A.D. 311), all in or near the Forum and all well-preserved structures; that of Drusus (B.C. 8) in the Appian Way, much mutilated; that of Gallienus (A.D. 262) on the Esquiline Hill, in a degraded style of architecture. Among the columns the most beautiful was Trajan's Pillar in the Forum of Trajan, 117 feet in height, still standing. The bass-reliefs with which it is enriched, extending in spiral fashion from base to summit, represent the exploits of Trajan, and contain about 2500 half and whole human figures. A flight of stairs within the pillar leads to the top. The most celebrated of the ancient sewers is the *Cloāca Maxima*, ascribed to Tarquinius Priscus, a most substantial structure, the outlet of which is still to be seen. The Roman aqueducts were formed by erecting one or several rows of arches superimposed on each other across a valley, and making the structure support a waterway or canal, and by piercing through hills which interrupted the water-course. Some of them brought water from a distance of upwards of 60 miles. Among others, the *Acqua Paola*, the *Acqua Trajana*, and the *Acqua Marzia*, still remain, and contribute to the supply of the city, and also its numerous important ornamental fountains. Among the magnificent sepulchral monuments, the chief were the mausoleum of Augustus in the Campus Martius; and that of Hadrian, on the west bank of the Tiber, now the fortress of modern Rome, and known as the Castle of St. Angelo. The city was also rich in splendid private buildings, and in the treasures of art, with which not only the public places and streets, but likewise the residences and gardens of the principal citizens, were ornamented, and of which comparatively few vestiges have survived the ravages of time. The catacombs of Rome are subterranean galleries which were used as burial-places and meeting-places, chiefly by the early Christians, and which extend under the city itself as well as the neighbouring country. The chief are the catacombs of Calixtus, St. Prætextatus on the Via Appia; of St. Priscilla, 2 miles beyond the Porta Salora; of St. Agnese, outside the Porta Pia; of S. Sebastiano, beneath the church of that name; &c. See *Catacombs*.

Modern Rome. General Features. — It was not till the 17th century that the modern city was extended to its present limits on the right bank, by a wall built under the pontificates of Urban VIII. (1623–44) and Innocent X. (1644–55), and inclosing both the Janiculum and the Vatican hills. The boundary wall on the left or east bank of the river follows the same line as that traced by Aurelian in the 3d century, and must in many parts be identical with the original structure. The walls on both banks are built of brick, with occasional portions of stone work, and on the outside are about 55 feet high. The greater part dates from A.D. 271 to 276. The city is entered by twelve gates (several of those of earlier date being now walled up) and several rail-

way accesses. Since Rome became the capital of united Italy great changes have taken place in the appearance of the city, many miles of new streets being built, and much done in the way of paving, drainage, and other improvements. It has thus lost much of its ancient picturesque appearance, and is rapidly acquiring the look of a great modern city with wide straight streets of uniform-looking tenements having little distinctive character. It is still, however, replete with ever-varying and pleasing prospects. The extensive excavations recently carried out have laid at last completely bare the remains of many of the grandest monuments of ancient Rome, notably the whole of Forum Romanum and the Via Sacra, the remains of the Temples of Saturn and of Castor and Pollux, the Temples of Vespasian, of Antoninus and Faustina, the Temple of Vesta, &c. A great number of villas and palaces and countless works of art have been brought to light. The villa-gardens, which have been for ages a distinctive feature of Rome, are rapidly disappearing, and are being covered with tenement houses, and new suburbs are springing up on every side. There are now ten bridges across the Tiber within the city. Several of these have been erected since the occupation of Rome by the Italian government, and others are in contemplation. A vast scheme of river embankment has been carried out to prevent the lower-lying parts of the city from being flooded as in former times.

Streets, Squares, &c.—Among the principal streets and squares of modern Rome are the Piazza del Popolo immediately within the Porta del Popolo on the north side of the city near the Tiber, with a fine Egyptian obelisk in its centre, and two handsome churches in front, standing so far apart from each other and from the adjoining buildings as to leave room for the divergence of three principal streets, the Via di Ripetta, the Corso, and the Via del Babuino. The Corso, recently widened and extended, stretches for upwards of a mile in a direct line to its termination at the Piazza di Venezia, not far from the Capitol, and is the finest street in the city. The appearance of the Capitol has been entirely altered to permit the erection of a monument to Victor Emmanuel. The Via del Babuino proceeds first directly to the Piazza di Spagna, thence to the Quirinal, and by a tunnel opens out on the Esquiline. It contains a large number of handsome edifices. The whole of the city to the east of this street, and in the triangular space included between it and the Corso, is well aired and healthy, and is regarded as the aristocratic quarter. The Ghetto, or Jews' quarter, which occupied several mean streets parallel to the river and connected by narrow lanes, was cleared away by the municipal improvements in 1889. The city is supplied with good water partly by the above-mentioned aqueducts, which, constructed under the greatest difficulties five-and-twenty centuries ago, still serve the purpose for which they were built, and remain monuments of engineering skill. The chief open spaces besides the Piazza del Popolo are the Piazza S. Pietro, with its extensive colonnade; the Piazza Navona, adorned with two churches and three fountains, one at each extremity and the third in the centre; the Piazza di Spagna, adorned by a monumental pillar and a magnificent staircase of travertine, leading to the church of Trinità de' Monti, conspicuously seated on an eminence above it; the Piazza Berberini, beside the palace of the same name, adorned by a beautiful fountain; the Piazza Colonna, in the centre of the city, with column of Marcus Aurelius; near it, in the Piazza di Monte Citorio, is the spacious Chamber of Deputies. Larger spaces for amusement or exercise have been formed only in a few spots. One of the finest is the Pincio, or 'hill of gardens,' overlooking the Piazza del Popolo, and commanding a fine view. It is a fashionable drive towards evening, and presents a gay and animated appearance. At a short distance outside the walls on the north of the city is the Villa Borghese, forming a finely-planted and richly-decorated park of 3 miles in circuit, which, though private property, forms the true public park of Rome, and is the favourite resort of all classes. Various localities in and near Rome that were malarious have been rendered healthy by planting eucalyptus trees.

Churches, &c.—The most remarkable of these is of course the cathedral of St. Peter, the largest and most imposing to be found anywhere, for the history and description of which see *Peter's* (*St.*). Another remarkable church is that of San Giovanni in Laterano, on an isolated spot near the south wall of the city. It was built by Constantine the Great, destroyed by an earthquake in 896, re-erected (904–911), burned in 1308, restored and decorated by Giotto. Again burned in

1360, rebuilt by Urban IV. and Gregory XI., and has undergone various alterations and additions from 1430 till the present façade was erected in 1734. A modern extension has involved the destruction of the ancient apse. From the central balcony the pope pronounces his benediction on Ascension-day; and the church is the scene of the councils which bear its name. The residence of the popes adjoined this church until the migration to Avignon; it is now occupied by the Gregorian Museum of the Lateran. Santa Maria Maggiore, which ranks third among the basilicas, was founded by Pope Liberius (352–366), but has since had many alterations and additions, the more notable being those of the 15th and 16th centuries. Its interior, adorned with thirty-six Ionic pillars of white marble supporting the nave, and enriched with mosaics, is well preserved, and one of the finest of its class. Santa Croce in Gerusalemme, the fourth of

Rome.—St. Peter's and the Vatican.

the Roman basilicas, takes its name from its supposed possession of a portion of the true cross, and a quantity of earth which was brought from Jerusalem and mixed with its foundation. Another church is that of San Clemente, on the Esquiline, a very ancient church, said to have been founded on the house of Clement, St. Paul's fellow-labourer, by Constantine, and containing a number of interesting frescoes by Masaccio. It consists of a lower and an upper church, and from an archæological point of view is one of the most interesting. Others are Il Gesù, on the Corso, the principal church of the Jesuits, with a façade and cupola by Giacomo della Porta (1577), and an interior enriched with the rarest marbles and several fine paintings, decorated in the most gorgeous style, and containing the monument of Cardinal Bellarmine; Sta. Maria-degli-Angeli, originally a part of Diocletian's Baths, converted into a church by Michael Angelo, one of the most imposing which Rome possesses, and containing an altar-piece by Muziano, a fine fresco by Domenichino, and the tomb of Salvator Rosa; Sta. Maria in Ara Cœli, on the Capitoline, a very ancient church approached by a very long flight of stairs, remarkable for its architecture and for containing the figure of the infant Christ called the *santissimo bambino* (see *Bambino*); Sta. Maria in Cosmedin, at the northern base of the Aventine, remarkable for its fine Alexandrine pavement and its lofty and beautiful campanile of the 8th century; Sta. Maria sopra Minerva, so called from occupying the site of a temple of that goddess, begun in 1285 and restored 1848–55, remarkable as the only Gothic church in Rome; and Sta. Maria in Dominica or della Navicella, on the Cælian, remarkable for eighteen fine columns of

granite and two of porphyry, and the frieze of the nave painted in *camaieu* by Giulio Romano and Perino del Vaga. Among other notable churches are Sta. Maria della Pace, celebrated for its paintings, particularly the four Sibyls, considered among the most perfect works of Raphael; Sta. Maria del Popolo, interesting from the number of its fine sculptures and paintings (Jonah by Raphael, ceiling frescoes by Pinturicchio, and mosaics from Raphael's cartoons by Aloisio della Pace); Sta. Maria in Trastevere, a very ancient church, first mentioned in 449, re-erected by Innocent III. in 1140, and recently restored; San Paolo fuori le Mura, erected to mark the place of St. Paul's martyrdom, founded in 388, and restored and embellished by many of the popes, burned in 1823, and since rebuilt with much splendour. It is of great size, and has double aisles and transepts borne by columns of granite. Above the columns of the nave, aisles, and transepts there is a continuous frieze enriched by circular pictures in mosaic, being portraits of the popes from St. Peter onwards, each 5 feet in diameter. Between the windows in the upper part of the nave are large modern pictures representing scenes from the life of St. Paul.

Palaces, Picture-galleries, &c. — The Vatican, adjoining St. Peter's, comprises the old and new palace of the popes (the latter now the ordinary papal residence), the Sistine chapel, the Loggie and Stanze, containing some of the most important works of Raphael, the picture-gallery, the museums (Pio-Clementino, Chiaramonti, Etruscan and Egyptian), and the library (220,000 vols. and over 25,000 MSS.). (See *Vatican.*) The palace on the Quirinal was formerly a favourite summer residence of the popes, but is now occupied by the King of Italy. (See *Quirinal.*) The Palazzo della Cancelleria is the only palace on the left bank of the river still occupied by the ecclesiastical authorities. The building was designed by Bramante, and is one of the finest in Rome. A series of palaces crowns the summit of the Capitol, and surrounds the Piazza del Campidoglio. It is approached from the north-west by a flight of steps, at the foot of which two Egyptian lions, and at the summit two colossal statues of Castor and Pollux standing beside their horses, are conspicuous. In the centre of the piazza is a bronze equestrian statue of Marcus Aurelius (161–181). On the south-east side of the piazza is the Senatorial Palace, in which the senate holds its meetings. The building also contains the offices of the municipal administration and an observatory. Its façade was constructed by Giacomo della Porta, under the direction, it is said, of Michael Angelo. On the south-west side of the piazza is the palace of the Conservatori, containing a collection of antique sculpture, including objects of art discovered during the recent excavations and a gallery of pictures. Opposite is the museum of the Capitol, with interesting objects of ancient sculpture and a picture-gallery. Among private palaces may be noted the Palazzo Barberini, on the Quirinal, with a collection of paintings. The library attached to it has numerous valuable MSS., with some other literary curiosities. The Palazzo Borghese, begun in 1590, has a fine court surrounded by lofty arcades, but is chiefly celebrated for its picture-gallery, containing the Aldobrandini Marriage and some other works of great renown. The Palazzo Colonna has a picture-gallery and a beautiful garden containing several remains of antiquity. The Palazzo Corsini has a picture-gallery, garden, and collection of MSS. and printed books of great value. The Palazzo Farnese, one of the finest in Rome, was built under the direction of Antonio da Sangallo, Michael Angelo, and Giacomo della Porta in succession. The celebrated antiquities it once contained (Farnese Bull, Hercules, Flora, &c.) are now in the museum of Naples. The Palazzo Rospigliosi, erected in 1603, contains some valuable art treasures; among others, on the ceiling of a casino in the garden is the celebrated fresco of Aurora by Guido. Villa Ludovisi, situated in the north of the city, the ancient gardens of Sallust, contains a valuable collection of ancient sculptures. Villa Farnesina, on the right bank, contains Raphael's charming creations illustrative of the myth of Cupid and Psyche.

Educational Institutions, Charities, &c.— Among educational institutions the first place is claimed by the university, founded in 1303. The most flourishing period of the university was the time of Leo X. (1513–22), under whom the building still occupied by it was begun. Attached to the university are an anatomical and a chemical theatre, and cabinets of physics, mineralogy, and zoology, as also botanic gardens, and an astronomical observatory. The university is attended by about 1500 students. The Collegio Romano, formerly a Jesuit college,

now contains the Archæological Museum and the recently established library, Biblioteca Vittorio Emanuele—consisting mostly of the old library of the Jesuits, augmented by the libraries of suppressed monasteries (about 500,000 vols.). The Collegio de Propaganda Fide has acquired great celebrity as the establishment where R. Catholic missionaries are trained. (See *Propaganda.*) The Accademia di San Luca, for the promotion of the fine arts, is composed of painters, sculptors, and architects, and was founded in 1595, and reorganized in 1874. Connected with it are a picture-gallery and schools of the fine arts. Other associations and institutions connected with art, science, or learning are numerous; one of them, the Accademia de' Lincei, founded in 1603 by Galileo and his contemporaries, is the earliest scientific society of Italy. Besides the Vatican and Vittorio Emanuele libraries mentioned above, the chief are the Biblioteca Casanatense, 200,000 vols.; the Biblioteca Angelica, 150,000 vols.; the Biblioteca Barberini, 100,000 vols. and over 10,000 MSS., &c. For elementary education much has been done since the papal rule came to an end. Hospitals and other charitable foundations are numerous. The principal hospital, called Spirito Santo, a richly-endowed institution situated on the right bank of the Tiber, combines a foundling hospital (with accommodation for 3000), a lunatic asylum (accommodation for 500), an ordinary infirmary (accommodation for 1000), and a refuge for girls and aged and infirm persons. The chief theatres are the Teatro Apollo, Teatro Argentina, Teatro Valle, the Capranica, Metastasio, Rossini, Costanzi, &c.

Trade and Manufactures.—The external trade is unimportant, and is carried on chiefly by rail, the Tiber being navigated only by small craft. There are railway lines connecting with the general system of Italy; and steamers run from Civita Vecchia and Fiumicino to Naples, Leghorn, Genoa, &c. For local passenger traffic there are now horse and electric tramways. A ship canal is projected to connect the city with the sea. The chief manufactures are woollen and silk goods, artificial flowers, earthenware, jewelry, musical strings, mosaics, casts, and various objects of art. The trade is chiefly in these articles, and in olive-oil, pictures, and antiquities.

History.—The ancient history of Rome has already been given in the preceding article. From the downfall of the empire its history is mainly identified with that of the papacy. (See *Popes, Papal States, Italy.*) An important event in its history is its capture and sack by the troops of the Constable of Bourbon in 1527. In 1798 Rome was occupied by the French, who stripped the palaces, churches, and convents of many works of art and objects of value. Pope Pius VI. was taken prisoner to France, where he soon afterwards died, and a Roman republic was set up. In 1848 Pope Pius IX. was driven from Rome, and another Roman republic formed under Mazzini and Garibaldi. A French army was sent to the pope's assistance, and after a determined resistance Rome was captured by the French in July 1849, and the pope returned and resumed his power under the protection of French bayonets (April 1850). The rule of the pope continued till Oct. 1870, when Rome was occupied by the Italian troops on the downfall of the French empire, and in June 1871 the 'Eternal City' became the capital of united Italy. The king took up his residence in the Quirinal; and to accommodate the legislature and various public departments numerous conventual establishments were expropriated. The population of the city has of late vastly increased. In 1870 it was 226,022; in 1881, 276,463; and in 1895 it was officially calculated at 471,801.

Rome, a city of the United States, Oneida county, New York, on the Mohawk River, 109 miles W.N.W. of Albany; has considerable manufactures of machinery, iron, and builders' wood-work, and a large trade in dairy produce. Pop. 14,991.

Rome, COUNCILS OF. See *Lateran Councils, Vatican Council.*

Romford, an ancient market-town in Essex, England, is situated on the Rom, about 12 miles E.N.E. of London. It is celebrated for its ale, and is surrounded by market-gardens. Pop. 8408.

Rom'illy, SIR SAMUEL, English lawyer, born 1757, died 1818. He was called to the bar in 1783, and gradually rose to be leader in the Court of Chancery. In 1805 he was appointed chancellor of Durham, and next year he became solicitor-general under Fox and Grenville, though he had not previously sat in parliament. At the same time he was knighted. When his party went out of office he remained in parliament, where he became distinguished by his talent in debate, and particularly by

the eloquence with which he urged the amelioration of the cruel and barbarous penal code which then prevailed. His efforts, though not attended with great success during his life, certainly hastened the just and necessary reforms which subsequently were effected, and entitle him to the name of a great and merciful reformer. Sir Samuel Romilly was at the height of popularity and reputation, when, in a fit of temporary insanity, caused by grief at his wife's death, he committed suicide in November 1818. His second son, also a lawyer, was created Lord Romilly in 1866.

Rommany. See *Gypsies.*

Romney, GEORGE, an English painter, born near Dalton, in Lancashire, in 1734; died at Kendal in 1802. He was the son of a carpenter, and at first worked at his father's trade, but he afterwards was apprenticed to an itinerant artist named Steele, and at the age of twenty-three began the career of a painter. After a certain amount of local success he went to London in 1762, and next year won a prize offered by the Society of Art for a historical composition. He steadily rose in popularity, and was finally recognized as inferior only to Reynolds and Gainsborough as a portrait-painter; some critics even placed him higher than either. His residence in London was interrupted by occasional visits to the Continent for purposes of study, and his most prosperous period dates from 1775, after his return from a visit of eighteen months to Rome. Many distinguished Englishmen and many ladies of rank sat to him for their portraits; but perhaps the most beautiful of his sitters was Emma Hart, afterwards Lady Hamilton, whom he depicted in very numerous characters. He did not neglect historical or imaginative compositions, and he contributed several pictures to Boydell's famous Shakspere gallery, founded in 1786. His health began to fail in 1797, and in 1799 he rejoined his wife (married in 1756), who throughout his whole London career had remained at Kendal. Romney displays a want of carefulness, and defective knowledge of anatomy in his historical compositions; but he atones for these faults by fine colour, a subtle sense of beauty, and by his originality. Fine examples of his work command high prices.

Romney, NEW, a small but ancient town of England in Kent, one of the Cinque Ports, formerly on the coast, but now some distance inland. Pop. 1366.

Romorantin (ro-mo-ràn-tan), a town of France, in the department of Loir-et-Cher, 23 miles S.E. of Blois, has manufactures of woollen goods and parchment. Pop. 6555.

Romsey, a municipal borough of England, Hampshire, on the Test or Anton, 8¼ miles N.W. of Southampton, with a fine old Norman church. Pop. 4276.

Rom'ulus was the mythical founder and first king of Rome. His mother was the Vestal virgin, Sylvia or Ilia, a daughter of Numitor, king of Alba. By the god Mars she became the mother of the twins Romulus and Remus, who were ordered by Amulius, the usurping brother of Numitor, to be thrown into the Anio. The basket containing the two boys was stranded beneath a fig-tree at the foot of the Palatine Hill, and they were suckled by a she-wolf and fed by a woodpecker, until they were accidentally found by Faustulus, the king's herdsman, who took them home and educated them. When they had grown up they organized a band of enterprising comrades, by whose help they deposed Amulius and reinstated Numitor on his throne. They next resolved to found a city, but as they disagreed as to the best site for it, they resolved to consult the omens. The decision was in favour of Romulus, who immediately began to raise the walls. This is said to have happened in the year 753 (according to others 752 or 751) B.C. Remus, who resented his defeat, leaped over the rude rampart in scorn, whereupon Romulus slew him. Romulus soon attracted a considerable number of men to his new city by making it a place of refuge for every outlaw or broken man, but women were still wanting. He therefore invited the Sabines with their wives and daughters to a religious festival, and in the midst of the festivities he and his followers suddenly attacked the unarmed guests, and carried off the women to the new city. This led to a war, which was, however, ended at the entreaties of the Sabine wives, and the two states coalesced. Romulus is said finally to have miraculously disappeared in a thunderstorm (B.C. 716).

Rom'ulus Augus'tulus, the last of the Roman emperors of the West. See *Rome.*

Rona, an island with a lighthouse in the Inner Hebrides, between Skye and the mainland of Scotland, 4¾ miles long, 1 broad. It is extremely barren, and of unattractive aspect. Pop. 159. — Also the name of a small island with remains of an ancient oratory, 44 miles N.E. of the Butt of Lewis.

Ron'aldshay, NORTH and SOUTH, respectively the most northerly and the most southerly of the Orkney Islands. NORTH RONALDSHAY, on which is a lofty lighthouse, is about 3 miles long by 2 miles broad, and has a fertile and well-cultivated soil. Pop. 501. —SOUTH RONALDSHAY, 6 miles from the mainland of Scotland, is about 7¾ miles long, with an average breadth of 2 miles. Its greatest elevation is 390 feet. The coast is much indented, and forms several good harbours. As in North Ronaldshay, the inhabitants are crofters, largely depending on the cod and herring fishery. Pop. 2315.

Roncesvalles (ron-thes-vâl'yes), a valley in Spanish Navarre, between Pampeluna and St. Jean de Port, where the rear of Charlemagne's army was defeated by the Gascons or Basques in 778, and the paladin Roland killed. Tradition and romance erroneously ascribe the victory to the Moors.

Ronciglione (ron-chēl-yō'nā), a small Italian town in the province of Rome, 35 miles N.W. from the capital, contains a Roman triumphal arch and a ruined castle. Pop. 5769.

Ronda, a town of S. Spain, in the prov. of and 40 miles west of Malaga, most romantically situated on a sort of rocky promontory surrounded on three sides by the Guadalvin, which flows through the 'Tajo,' a deep chasm separating the old Moorish town, with its narrow tortuous lanes and Moorish towers, from the modern quarter. Over this ravine there are an old and a modern bridge, the latter about 600 feet above the water. Ronda is famous for its bull-fights, for which it has one of the largest bull-rings in Spain. It has manufactures of steel wares, cloth, &c., and is celebrated for its fruits. Pop. 19,181.

Rondele'tia, a genus of shrubs, nat. order Rubiaceæ, characterized by having a calyx with a subglobular tube. They occur chiefly in tropical America and the West Indies. A kind of fever bark is obtained at Sierra Leone from *Rondeletia febrifuga*. A perfume sold as rondeletia takes its name from this plant, but is not prepared from any part of it.

Rondo (Italian), or RONDEAU (French), a poem of thirteen lines, usually octosyllabic, written throughout on two rhymes and arranged in three unequal stanzas; while the two or three first words are repeated as a refrain after the eighth and thirteenth lines. The term is also applied to a musical composition, vocal or instrumental, generally consisting of three strains, the first of which closes in the original key, while each of the others is so constructed in point of modulation as to reconduct the ear in an easy and natural manner to the first strain.

Rönne (rén'ne), chief town of the Danish Island of Bornholm, is a seaport with several ship-building yards, a mercantile fleet of 80 vessels, and considerable trade. Pop. 6472.

Ronneburg, a town of Germany, in Saxe-Altenburg, 14 miles south-west of Altenburg, contains an old château, and has some manufactures. Pop. 5658.

Ronsard (ron-sär), PIERRE DE, French poet, born in 1524, died in 1585. At the age of twelve he became page to the Duc d'Orleans; and in 1537 he accompanied James V. of Scotland and his bride, Madeleine of France, back to their kingdom. He also spent six months at the English court, and after his return to France in 1540 was employed in a diplomatic capacity in Germany, Piedmont, Flanders, and Scotland. He was compelled, however, by deafness to abandon the diplomatic career; and he devoted himself to literary studies, and became the chief of the band of seven poets afterwards known as the 'Pléiade.' Ronsard's popularity and prosperity during his life were very great. Henry II., Francis II., and Charles IX. esteemed him, and the last bestowed several abbacies and priories on the poet. His writings, consisting of sonnets, odes, hymns, eclogues, elegies, satires, and a fragment of an epic poem, La Franciade, were read with enthusiastic admiration by his contemporaries both at home and abroad, but the succeeding classic re-action involved them in a contemptuous neglect from which they did not emerge till the second quarter of the 19th century. Ronsard combines magnificent language and imagery with a delicate sense of harmony.

Rood, a measure of surface, the fourth part of an acre, equal to 40 square poles or perches, or to 1210 square yards.

Rood, an old English name for a cross, especially applied to a large crucifix or image of Christ on the cross, placed at the entrance to the chancel in the old churches, generally resting on the rood-beam or rood-screen, often in a narrow gallery called the *rood-loft*.

Roof, the cover of any building, irrespective of the materials of which it is composed. Roofs are distinguished, 1st, by the materials of which they are mainly formed,

as stone, wood, slate, tile, thatch, iron, &c.; 2d, by their form and mode of construction,

Shed Roof. Gable Roof.

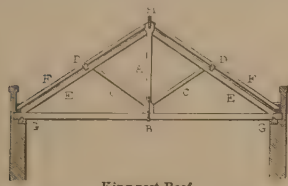
as shed, curb, hip, gable, pavilion, ogee, and flat roofs. The *span* of a roof is the width

Hip Roof. Conical Roof. Ogee Roof.

between the supports; the *rise* is the height in the centre above the level of the supports;

Curb Roof. M-Roof.

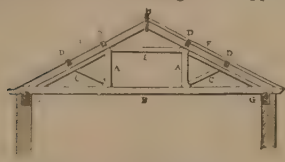
the *pitch* is the slope or angle at which it is inclined. In carpentry roof signifies the



King-post Roof.

A, King-post.
C C, Struts or braces.
E E, Backs or principal rafters.
G G, Wall-plates.
B, Tie-beam.
D D, Purlins.
F F, Common rafters.
H, Ridge-piece.

timber framework by which the roofing materials of the building are supported.



Queen-post Roof.

A A, Queen-posts.
C C, Struts or braces.
E, Straining-beam.
G G, Wall-plates.
B, Tie-beam.
D D, Purlins.
F F, Common rafters.
H, Ridge-piece.

This consists in general of the principal rafters, the purlins, and the common rafters. The principal rafters, or principals, are set across the building at about 10 or 12 feet apart; the purlins lie horizontally upon these, and sustain the common rafters, which carry the covering of the roof. Sometimes, when the width of the building is not great, common rafters are used alone to support the roof.

Rook, a bird of the crow family (*Corvus frugilegus*), differing from the crow in not feeding upon carrion, but on insects and grain. It is also specially distinguished by its gregarious habits, and by the fact that the base of the bill is naked, as well as the forehead and upper part of the throat. In Britain and Central Europe the rook is a permanent resident; but in the north and south it is migratory in habits.

Rooke, Sir George, an English admiral, was born near Canterbury in 1650, died 1709. He entered the navy at an early age and rose to be vice-admiral in 1692. For his gallantry in a night-attack upon the French fleet off Cape La Hogue he was knighted in 1692. His farther services include the command of the expedition against Cadiz in 1702, the destruction of the French and Spanish fleets in Vigo Bay (1702), and a share in the capture of Gibraltar in July 1704. In the following August he fought a French fleet of much superior force, under the Comte de Toulouse, off Malaga. The result was undecisive, and this fact was used against Rooke by his political opponents. Sir George quitted the service in disgust in 1705. He served in several parliaments as member for Portsmouth.

Roon (rōn), Albrecht Theodor von, a Prussian war minister, field-marshal, and count, was born in 1803 and died in 1879. He entered the army at the age of eighteen, and speedily developed a high talent for the theoretical and educational branches of his profession, was military lecturer at Berlin, and published several books on military geography and similar subjects. Captain in 1836, major in 1842, colonel in 1851, he was appointed war minister in 1859, minister of marine in 1861, and instituted many reforms. In 1866 he was made general of infantry, and was present with the army in Bohemia during the Seven Weeks' war against Austria. It was chiefly due to his efforts that the North German army was in so perfect a state of readiness and able to be so rapidly mobilized on the outbreak

of war with France in 1870. On the conclusion of the war Von Roon was made a count, and on Jan. 1, 1873, he became a field-marshal and minister-president of Prussia. In November of the same year, however, he laid down his public offices and retired to his estate in Silesia, where he chiefly resided until his death.

Roorkee. See *Rurki.*

Root, in arithmetic and algebra, denotes any number or quantity which, by successive multiplications into itself, produces a certain other number. Thus 2 is a root of 4, because $2 \times 2 = 4$. A number which once multiplied by itself gives a number is called the second or square root, if multiplied three times the third or cube root, and so on with the fourth or biquadrate, fifth, sixth root, &c. The algebraic sign of *a* root is $\surd$, and the fourth root of 16, equal to 2, is written thus: $\sqrt[4]{16} = 2$. The same is the case with algebraic magnitudes, as $\sqrt[3]{(a^2 + 2ab + b^2)} = a + b$.

Root, of plants, that part of a plant which enters and fixes itself in the earth, or, in the case of parasites, to other plants, and serves to support the plant, while by means of its radicles it imbibes nutriment for the stem, branches, leaves, and fruit. Roots receive different names according to their structure, forms, and positions, as branched, bulbiferous, fibrous, horizontal, oblique, simple, tapering, vertical, &c.

Root-stock. See *Rhizome.*

Rope, a general name applied to cordage over 1 inch in circumference. Ropes are usually made of hemp, flax, cotton, coir, or other vegetable fibre, or of iron, steel, or other metallic wire. A hempen rope is composed of a certain number of yarns or threads which are first spun or twisted into *strands,* and the finished rope goes under special names according to the number and arrangement of the strands of which it is composed. A *hawser-laid rope* is composed of three strands twisted left-hand, the yarn being laid up right-hand. *A cable-laid rope* consists of three strands of hawser-laid rope twisted right-hand; it is called also *water-laid,* or *right-hand rope.* A *shroud-laid rope* consists of a central strand slightly twisted, and three strands twisted around it, and is thus called also *four-strand rope.* A *flat rope* usually consists of a series of hawser-laid ropes placed side by side and fastened together by sewing in a zigzag direction. Wire ropes are made of a certain number of wires twisted into the requisite number of strands, and are now extensively used in the rigging of ships as well as for cables. For greater flexibility hempen cores are used; thus for instance we may have a rope of six strands around a hempen core, each strand consisting of six wires around a smaller hempen core. Steel-wire makes a considerably stronger rope than iron wire. Coir ropes are much used on board ships, as, though not so strong as hemp, they are not injured by the salt water.

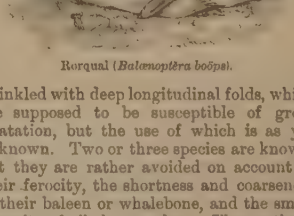
Roquefort (rok-fōr), a village of S. France, department Aveyron, giving name to a well-known variety of cheese largely made in the locality. Pop. 800.

Roraima (ro-rà-ē′mà), a celebrated mountain in South America, where the boundaries of British Guiana, Venezuela, and Brazil meet, 7800 feet high, flat-topped, with steep rocky sides, rendering the summit almost inaccessible. Mr. E. im Thurn was the first to reach its top in 1884.

Roree. See *Rohri.*

Roric Figures, the name given to certain curious appearances seen on polished solid surfaces after breathing on them; also to a class of related phenomena produced under very various conditions, but agreeing in being considered as an effect of either light, heat, or electricity.

Rorqual, the name given to certain whales, closely allied to the common or whalebone whales, but distinguished by having a dorsal fin, with the throat and under parts



Rorqual (*Balænoptĕra boöps*).

wrinkled with deep longitudinal folds, which are supposed to be susceptible of great dilatation, but the use of which is as yet unknown. Two or three species are known, but they are rather avoided on account of their ferocity, the shortness and coarseness of their baleen or whalebone, and the small quantity of oil they produce. The northern rorqual (*Balænoptĕra boöps*) attains a great size, being found from 80 to over 100 feet in length, and is thus the largest living animal known. The rorqual feeds on cod, herring, pilchards, and other fish, in pursu-

ing which it is not seldom stranded on the British shores.

Rosa, Monte, a mountain or group of the Pennine Alps, lies on the frontiers of the Swiss canton of Valais and Piedmont, and forms part of the watershed between the Rhone and the Po. Next to Mont Blanc it is the highest mountain in the Alps, but as a group it is much more massive than the Mont Blanc group. It has eight summits above 14,000 feet, the highest being Dufourspitze (15,217), ascended for the first time in 1855. Of the huge glaciers that occupy the slopes of this mountain the chief are the Görner Glacier on the west, the Schwarzberg and Findelen Glaciers on the north, the Sesia and Macugnaga Glaciers on the east, and the Lys Glacier on the south.

Rosa, Salvator, Italian painter, etcher, and poet, born near Naples in 1615, died in 1673. He received instruction in art from his brother-in-law, Francesco Fracanzaro, a pupil of Ribera, but his taste and skill were more influenced by his studies of nature on the Neapolitan coast. Rosa's father, dying in 1632, left his family in difficulties, and Salvator was compelled to sell his landscapes for small sums. One of his pictures fell into the hands of the painter Lanfranco, who at once recognized the genius of the youth, and encouraged him to go to Rome. In 1638 Rosa settled in Rome, where he soon established his reputation and rose to fame and wealth. The bitterness of his satire, expressed both in his satirical poems and in an allegorical painting of the Wheel of Fortune, rendered his stay in Rome inadvisable. He therefore accepted an invitation to Florence (1642), where he remained nearly nine years, under the protection of the Medici. He finally returned to Rome, where he died. Salvator Rosa delighted in romantic landscape, delineating scenes of gloomy grandeur and bold magnificence. He also painted battle-scenes, and latterly historical pictures. His poems were all satires, vigorous enough and pungent; among them are Babylon (*i.e.* Rome), Music, Poetry, Painting, War, and Envy. Rosa etched from his own works with great skill.

Rosa'cea, Acne Rosacea, or Gutta Rosea, an affection which appears on the face, especially the nose, forehead, cheeks, and skin, characterized by an intense reddening of the skin without swelling. Persons who indulge in alcohol to excess are liable to it. Regular habits, and plain and temperate living, both prevent and cure.

Rosa'ceæ, a large and important order of plants, of which the rose is the type, distinguished by having several petals, distinct, perigynous, separate carpels, numerous stamens, alternate leaves, and an exogenous mode of growth. The species, including herbs, shrubs, and trees, are for the most part inhabitants of the cooler parts of the world. Scarcely any are annuals. The apple, pear, plum, cherry, peach, almond, nectarine, apricot, strawberry, raspberry, and similar fruits, are the produce of the order. Some of the species are also important as medicinal plants. The genera of this order are divided by Viner into six tribes, viz. Roseæ, Spiræeæ, Amygdaleæ, Sanguisorbeæ, Dryadeæ, and Pomeæ.

Rosamond, commonly called Fair Rosamond, the mistress of Henry II. of England, was the daughter of Walter de Clifford, a knight of property in various shires. She died in 1176 or 1177, soon after her connection with the king was openly avowed, and was buried in the church of Godstow Nunnery, whence, however, Hugh of Lincoln caused her body to be removed in 1191. Almost everything else related of Rosamond is legendary. The fable of the dagger and poison with which the jealous Queen Eleanor is said to have sought out her rival has not been traced higher than a ballad of 1611.

Rosan'iline ($C_{20}H_{19}N_3$), an organic base, a derivative of aniline, crystallizing in white needles, capable of uniting with acids to form salts, which salts form the well-known rosaniline colouring matter of commerce.

Rosa'rio, a town of the Argentine Republic, in the province of Santa Fé, on the right bank of the Paraná, 170 miles northwest of Buenos Ayres. Founded in 1725 as an Indian settlement, it was still a humble village in 1854 when it was made a port of entry, but since then its progress has been marvellous, and it is now the second city in the republic. It has communication by rail and river with Buenos Ayres, and also by railway with the interior provinces. The town is laid out on the rectangular plan, and is provided with gas, tramways, &c. It contains foundries, brick-works, jam-factories, breweries, tanneries, soap-works, timber and flour mills, &c., but its commerce is of greater importance than its manufactures. Pop. 93,584.

Ro'sary, among Roman Catholics the recitation of the Ave Maria and the Lord's Prayer a certain number of times. The name is also commonly given to the string of

beads by means of which the prayers are counted. The complete or Dominican rosary consists of 150 small beads for the Aves, divided into groups of 10 by 15 large beads for the Paternosters. The ordinary rosary has only 50 small beads and 5 large beads; but if repeated thrice makes up the full rosary. A doxology is said after every tenth Ave. The use of rosaries was probably introduced by the Crusaders from the East, for both Mohammedans and Buddhists make use of strings of beads while repeating their prayers; but St. Dominic is usually regarded as the inventor in the Roman Church.

Roscelli'nus, or **Roscelin**, Joannes, a heretical theologian of the 12th century, was a native of Northern France. A nominalist in philosophy, he was a tritheist in theology, but was forced to recant by the synod of Soissons in 1092, while Anselm refuted him in his De Fide Trinitatis. After an attempt to make capital out of Anselm's quarrel with William Rufus, Roscelin settled at Tours, where he entered into a violent theological controversy with Abelard, who had been his pupil. His subsequent history is not known.

Roscius, Quintus, the most celebrated comic actor at Rome, born a slave about 134 B.C. He realized an enormous fortune by his acting, and was raised to the equestrian rank by Sulla. He enjoyed the friendship of Cicero, who in his early years received instruction from the great actor. Roscius died about 62 B.C.

Roscoe (ros'kō), Sir Henry Enfield, a distinguished chemist, born in London 1833, a grandson of William Roscoe. Educated at Liverpool High School, University College, London (B.A. 1852), and Heidelberg, Roscoe on his return to England devoted himself to science, especially chemistry, in which he has done some most useful and brilliant work. From 1858 till 1886 he was professor of chemistry at Owens College, Manchester, and from 1885 to 1895 he represented South Manchester in parliament in the Liberal interest. Honours of all kinds have flowed in upon him from the universities (LL.D. Cantab. 1883; D.C.L. Oxon. 1887) and learned societies (Royal Society's gold medal, 1873); and in Nov. 1884 he was knighted. His works include Investigations on the Chemical Action of Light, Lessons in Elementary Chemistry; Lectures on Spectrum Analysis; and, with Professor Schorlemmer, a Treatise upon Chemistry (3 vols. 1877–84).

Roscoe, Thomas, fifth son of William Roscoe, born near Liverpool 1791; died at London 1871; author, translator, and editor. In 1823 he published translations of Sismondi's Literature of Southern Europe, and Memoirs of Benvenuto Cellini; in 1828 a translation of Lanzi's History of Painting in Italy; in 1839 Life and Writings of Cervantes. He edited the Novelist's Library (16 vols. 12mo, 1831–33), and translated a series of foreign novels, besides writing several books of travels.

Roscoe, William, historian and miscellaneous writer, was born in 1753, died 1831. After a not very extensive education he was in 1769 apprenticed to an attorney in Liverpool; and in 1774 he entered into partnership with Mr. Aspinall. During his apprenticeship he had not only studied Latin, but had also attained great proficiency in Italian and French, and even amidst the responsibilities of business he continued his studies in literature and art. He felt strongly on the question of the abolition of slavery, and published a poem (The Wrongs of Africa) and several controversial pamphlets on the subject. In 1796 his great work, Life of Lorenzo de' Medici, was published, and at once gained him a high reputation, which was perhaps neither lessened nor enhanced by his Life and Pontificate of Leo X. (1805). In 1796 Roscoe retired from the business of an attorney, and he eventually became a partner in a Liverpool banking-house in 1800. For about a year, in 1806–7, he represented Liverpool, his native town, in parliament. In 1816 the bank fell into difficulties, which resulted in bankruptcy in 1820. Roscoe spent his last years in literary and scientific pursuits.

Roscom'mon, an inland county of Ireland, in the east of the province of Connaught, has an area of 607,691 acres, of which 480,813 are productive. The surface is undulating or flat, except in the north. The Shannon bounds most of the county in the east, and the Suck on the north-west. The chief of the numerous lakes is Lough Ree, an expansion of the Shannon. Roscommon contains iron and coal, but limestone is the only mineral now worked. Many districts are highly fertile, and the pastures are among the best in Ireland. The chief crops are oats and potatoes. The chief towns are Roscommon, Boyle, and Castlerea. The county sends two members to parliament. Pop. 114,397.—The county-town, Roscommon, 80 miles from Dublin, contains the

ruins of an abbey founded in 1257, and of a fine castle of about the same date. It gives the title of earl to the Dillon family. Pop. 1994.

Roscommon, WENTWORTH DILLON, FOURTH EARL OF, English minor poet, born 1633, died 1685. He was a favourite at the court of Charles II. His chief poems are Essay on Translated Verse, a translation of Horace's Art of Poetry, and some smaller pieces. He has been called the only moral writer of the reign of Charles II.

Roscrea (ros-krā'), a market town of Ireland, in the county of Tipperary, 95 miles S.W. of Dublin, contains the ruins of two castles and an abbey, and a well-preserved round tower 80 feet high. Pop. 2568.

Rose, the beautiful and fragrant flower which has given name to the large natural order Rosaceæ, seems to be confined to the cooler parts of the northern hemisphere. The species are numerous, and are extremely difficult to distinguish. They are prickly shrubs, with pinnate leaves, provided with stipules at their base; the flowers are very large and showy; the calyx contracts towards the top, where it divides into five lanceolate segments; the corolla has five petals, and the stamens are numerous; the seeds are numerous, covered with a sort of down, and are attached to the interior of the tube of the calyx, which, after flowering, takes the form of a fleshy globular or ovoid berry. The rose is easily cultivated, and its varieties are almost endless. There are about twenty species of rose natives of Britain, common examples being the dog-rose (*Rosa canina*), Scotch rose (*R. spinosissima*), sweet-brier or eglantine (*R. rubiginōsa*), &c. In the natural state the flowers are single, but double varieties, such as the damask rose (*R. damascēna*), Provence rose (*R. centifolia*), and musk-rose (*R. moschāta*) were introduced into Britain 300 years ago. Upwards of 1000 named varieties of rose are now recorded, and the number is being constantly increased. In some countries roses are extensively cultivated for the manufacture of rose-water, attar of roses, &c.

Rose, a disease. See *Erysipelas.*

Rose Acacia (*Robinia hispida*, natural order Leguminosæ), a highly ornamental flowering shrub inhabiting the southern parts of the Alleghany Mountains, and now frequently seen in gardens in Europe. It is a species of locust; the flowers are large, rose-coloured, and inodorous; the pods are glandular-hispid. See *Locust.*

Rose-apple, or MALABAR PLUM, a tree of the genus *Eugenia*, the *E. Jambos*, belonging to the natural order Myrtaceæ. It is a branching tree, a native of the East Indies. The fruit is about the size of a hen's egg, is rose-scented, and has the flavour of an apricot.

Roseau (ro-zō), the capital of the island of Dominica (which see).

Rose-bay, the name of several plants; as, (*a*) the *Nerium Oleander.* See *Oleander.* (*b*) The *dwarf rose-bay,* a plant of the genus *Rhododendron,* having handsome flowers. (*c*) *Epilobium angustifolium,* or French willow. See *Epilobium.*

Rosebery, ARCHIBALD PHILIP PRIMROSE, EARL OF, born in 1847, was educated at Eton and Oxford, and succeeded his grandfather in 1868. He is an advanced Liberal in politics, and a ready and effective speaker. He was under-secretary at the home office from 1881 to 1883, lord privy seal and first commissioner of works 1885, and next year held the secretaryship of foreign affairs till the fall of the Gladstone government. In 1878 he was elected lord-rector of Aberdeen University, and in 1881 of Edinburgh University. He has been twice chairman of the London County Council. In 1892–94 he was secretary for foreign affairs under Mr. Gladstone, and in 1894–95 he was himself Prime Minister. He has advocated the reform of the House of Lords, and is much interested in the questions of imperial federation and the social condition of the masses. In 1878 he married Hannah, daughter of Baron Mayer de Rothschild, but lost his wife in 1890. He is author of an excellent work on Pitt.

Rose-camphor, one of the two volatile oils composing attar of roses. It is a stearoptene, and is solid.

Rose-campion, a British plant (*Lychnis coronaria*) belonging to the pink family.

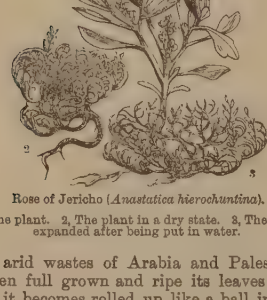
Rose-chafer, or ROSE-BEETLE (*Cetonia aurata*), a beetle included in the tribe of Lamellicornia, which frequents roses, feeding on the honey they contain. The rose-chafer or rose-bug of the United States is the *Macrodactylus subspinosus,* a smaller coleopterous insect destructive to roses and other plants.

Rosemary (*Rosmarinus officinālis*), a shrubby aromatic plant (natural order Labiatæ), a native of S. Europe. It has but two stamens; the leaves dark green, with a white under surface; the flowers are pale blue. At one time of considerable repute

for medicinal purposes, rosemary is now esteemed chiefly for yielding, by distillation, the aromatic perfume known as oil of rosemary.

Rose-noble, an English gold coin of the value of 10*s.*, first struck by Edward IV. in 1465, and so called to distinguish it from the old nobles (worth 6*s.* 8*d.*), and because it was stamped on one side with the figure of a rose.

Rose of Jericho (*Anastatica hierochuntina*), a small cruciferous plant, growing in



Rose of Jericho (*Anastatica hierochuntina*).

1, The plant. 2, The plant in a dry state. 3, The same expanded after being put in water.

the arid wastes of Arabia and Palestine. When full grown and ripe its leaves drop and it becomes rolled up like a ball in the dry season, but opens its branches and seed-vessels when it comes in contact with moisture. The generic name has been applied to it from this circumstance, and in Greek signifies resurrection.

Rose'ola, in medicine, a kind of rash or rose-coloured efflorescence, mostly symptomatic, and occurring in connection with different febrile complaints. Called also *rose-rash* and *scarlet rash*.

Roses, Wars of the, the fierce struggle for the crown of England between the Lancastrians (who chose the red rose as their emblem) and the Yorkists (who chose the white); it lasted with short intervals of peace for thirty years (1455–85), beginning with the battle of St. Albans and ending with Bosworth Field. See *England*, section *History*.

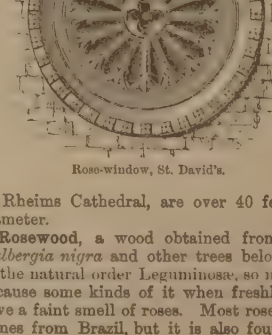
Roset'ta (Egyptian, *Reshîd*, the ancient *Bolbitine*), a city of Egypt, near the mouth of the Rosetta branch of the Nile, 30 miles w. of Alexandria. Rosetta at one time enjoyed a large transit trade, which, however, has now been almost entirely diverted to Alexandria. The town is well built and attractive in appearance. Pop. 19,378.

Rosetta-stone, a tablet of black basalt, bearing an inscription in three versions (hieroglyphic, enchorial, and Greek) in honour of Ptolemy Epiphanes and belonging to about 196 B.C. It furnished the key for the deciphering of the hieroglyphic inscriptions. The stone, discovered by the French near Rosetta in 1799, is now in the British Museum. See *Hieroglyphics*.

Rosetta-wood a handsome furniture wood, of an orange-red colour with very dark veins, imported from the East Indies. It is of durable texture, but the colours become dark by exposure. The tree yielding it is not known.

Rose-water, a perfume prepared from roses; in Europe chiefly from the cabbage rose (*R. centifolia*), in India and the East from the damask rose (*R. damascena*).

Rose-window, a circular window, divided into compartments by mullions and tracery radiating from a centre, also called Catharine-wheel, and marigold-window, according to modifications of the design. It forms a fine feature in the church architecture of the 13th and 14th centuries, and is mostly employed in the triangular spaces of gables. In France it is much used, and, notwithstanding difficulties of construction, attained great size. Some examples, as that



Rose-window, St. David's.

at Rheims Cathedral, are over 40 feet in diameter.

Rosewood, a wood obtained from the *Dalbergia nigra* and other trees belonging to the natural order Leguminosæ, so named because some kinds of it when freshly cut have a faint smell of roses. Most rosewood comes from Brazil, but it is also found in

Honduras and Jamaica. The name is sometimes given to timber from other sources; but the French *Bois de Rose* (the German *Rosenholz*) is called tulip-wood in English.

Rosewood, Oil of, same as oil of rhodium. See *Rhodium.*

Rosicrucians, members of a secret society, the first account of which was published early in the 17th century in two books now generally ascribed to J. V. Andreæ, a Lutheran clergyman of Württemberg. Many regard Andreæ's writings as merely a veiled satire on his own times, and deny altogether the actual existence of any such society, in spite of the fact that since his day many persons (*e.g.* Cagliostro) have professed to belong to it. The aim of the Rosicrucians, or Brothers of the Rosy Cross, was said to be the improvement of humanity by the discovery of the 'true philosophy,' and they claimed a deep knowledge of the mysteries of nature, such as the permutation of metals, the prolongation of life, the existence of spirits, &c. According to Andreæ the society was founded in the 14th century by a German baron named Rosenkreuz (*i.e.* 'rosy cross'), who was deeply versed in the mysterious lore of the East, and who assembled the initiated in a house called the Sancti Spiritus Domus. The 'secret' of the order, if it ever existed, has been faithfully guarded by its members; and the general cloud of mystery shrouding its history and objects has led to its being connected in public opinion with the Cabalists, Illuminati, &c. Some regard Rosicrucianism as the origin of freemasonry.

Rosin, the name given to the resin of coniferous trees employed in a solid state for ordinary purposes. It is obtained from turpentine by distillation. In the process the oil of the turpentine comes over and the rosin remains behind. There are several varieties of rosin, varying in colour from the palest amber to nearly black, and from translucent to opaque. It differs somewhat according to the turpentine from which it is derived, this being obtained from numerous species of pine and fir. Rosin is a brittle solid, almost flavourless, and having a characteristic odour. It is used in the manufacture of sealing-wax, varnish, cement, soap, for soldering, in plaisters, &c. Colophony is a name for the common varieties.

Roskolnicians. See *Raskolniks.*

Roslin, or **Rosslyn,** a small village in the county of Midlothian, about 7 miles south of Edinburgh, interesting chiefly for its ruined castle and chapel. Roslin Castle is of uncertain origin, but it was the ancient seat of the St. Clairs or Sinclairs, who lived here in great splendour in the 15th century. The present buildings were mostly erected since the burning of the castle by the Earl of Hertford in 1554. Roslin Chapel was founded in 1450 by Sir William St. Clair, and is a Gothic structure forming the chancel and part of a transept of a church, no more of which was ever built. The interior is richly adorned with exquisite carving. Pop. 611.

Rosmi'ni-Serba'ti, Antonio, modern Italian philosopher, born at Roveredo, Tyrol, 1797; died 1855. He entered the priesthood and founded the charitable order of Rosminians, which have branches in Italy, France, Britain, and America. He is regarded as the founder of modern Idealism in Italy. The chief points of his system are fully treated in his New Essay on the Origin of Ideas, translated into English, 1883. He was a most voluminous writer on religious and miscellaneous subjects as well as on philosophy.

Rosol'ic Acid ($C_{20}H_{16}O_3$), an acid prepared by treating hydrochloride of aniline with nitrate of soda and then boiling with sulphuric acid. It is used in preparing a blue dye.

Ross, a town near the Wye, in Herefordshire, England, giving name to a parl. div. The philanthropic John Kyrle (died 1724), Pope's 'Man of Ross', is buried in the handsome parish church. Pop. 3575.

Ross, Alexander, Scottish poet, born 1699, died 1784. He was schoolmaster at Lochlee in Forfarshire, and author of Helenore, the Fortunate Shepherdess, a pastoral poem in the Scottish dialect, formerly very popular in the North of Scotland.

Ross, Alexander, born in Nairnshire, Scotland, 1783; died at Red River Settlement (Winnipeg), 1856. He went to Canada in 1805; joined Astor's expedition to Oregon in 1810, and was afterwards a fur-trader in the Hudson's Bay service. He is the author of Adventures of the First Settlers on the Oregon, Fur Hunters of the Far West, and the Red River Settlement.

Ross, Sir James Clark, Arctic and Antarctic explorer, was born in London in 1800; died in 1862. He entered the British navy at the age of twelve, accompanied his uncle Sir John Ross (see following article) on his two voyages in search of a north-west passage, and in the interval between

them accompanied Captain William Parry in his three Arctic voyages. He was promoted to the rank of post-captain in 1834, particularly for the discovery of the north magnetic pole in 1831. He commanded the expedition in the *Erebus* and *Terror* to the Antarctic Ocean in 1839–43; and on his return published a narrative of that voyage, which had contributed largely to geographical and scientific knowledge generally. Captain Ross was knighted for his services, and received numerous other honours. In 1848 he made a voyage in the *Enterprise* to Baffin's Bay in search of Sir John Franklin.

Ross, Sir John, Arctic navigator, born in 1777, died in 1856, was the fourth son of the Rev. Andrew Ross, minister of Inch, Wigtownshire. In 1786 he entered the navy, and he saw a considerable amount of service before the peace of 1815, which found him with the rank of commander. In 1817 he accepted the command of an admiralty expedition to search for a north-west passage, and in April 1818 set sail in the *Isabella*, accompanied by Lieut. Parry in the *Alexander*. After passing through Davis' Straits and Baffin's Bay the vessels entered Lancaster Sound, and proceeded up it for a considerable distance, when Ross conceived the erroneous idea that the sound was here brought to a termination by a chain of mountains, and accordingly returned to England. Shortly after landing he was advanced to the rank of post-captain, and the following year published an account of his voyage. His next expedition, in the steamer *Victory*, was equipped by Sir Felix Booth, and set out in May 1829. Ross entered Prince Regent's Inlet, and discovered and named Boothia Felix and King William's Land. In 1832 he was forced to abandon his ships, and he and his crew suffered great hardships before they were picked up in August 1833 by his old ship the *Isabella*. In 1834 Captain Ross was knighted, and in the following year published a narrative of his second voyage. From 1839 till 1845 Sir John Ross was consul at Stockholm. In 1850 he made a last Arctic voyage in the *Felix*, in a vain endeavour to ascertain the fate of Sir John Franklin. He became a rear-admiral in 1851.

Ross and Cromarty, formerly two separate counties of Scotland, now united into one. The latter consisted merely of detached portions scattered over the former. The county extends across the breadth of Scotland from the North Sea to the Atlantic, between the counties of Inverness and Sutherland, and includes the island of Lewis and other islands. Area of the whole, 2,003,065 acres, of which 220,586 belong to Cromarty. The west coast is bold and rugged, and deeply indented with bays and inlets (Lochs Alsh, Carron, Torridon, Ewe, Greinord, Broom, and Gairloch). The principal inlets on the east coast are Beauly Loch and Firth, and Cromarty and Dornoch Firths. The peninsula lying between Cromarty Firth and Beauly Loch and Firth is called the Black Isle. A great portion of Ross and Cromarty consists of irregular masses of lofty rugged mountains, some of which are from 3500 to 3860 feet in height. Pasture of excellent quality abounds in the w., while good agricultural lands extend along the Firths of Moray, Cromarty, and Dornoch. Sheep farming and grazing are extensively carried on. There are no rivers of any size, but there are several fine lakes, the principal of which is Loch Maree, about 12 miles long by 2 miles broad. The united county returns a member to Parliament. Principal towns: Dingwall (the county town), Stornoway, Cromarty, Invergordon, Tain, and Fortrose. Pop. 78,727.

Rossa'no, an ancient town of Southern Italy, province of Cosenza, 3 miles south of the Gulf of Taranto. In the neighbourhood are quarries of alabaster and marble. Pop. 18,141.

Rossbach (ros'bȧh), a village in the Prussian province of Saxony, between Naumburg and Merseburg, famous for the decisive victory which Frederick the Great obtained there, during the Seven Years' war, over the imperial and French troops under Marshal Soubise, November 5, 1757.

Rosse, William Parsons, third Earl of, was born at York in 1800, died 1867. Though an M.P. from 1821, and afterwards a representative Irish peer, Lord Rosse's chief attention was devoted to the study of practical astronomy. In 1827 he constructed a telescope, the speculum of which had a diameter of 3 ft., and the success and scientific value of this instrument induced him to attempt to cast a speculum twice as large. After innumerable difficulties, for every step had to be pioneered by experiment, and after many failures, Lord Rosse succeeded in 1845 in perfecting machinery which turned out the huge speculum, weighing 3 tons, without warp or flaw. It was then mounted in his park at Parsonstown,

at a cost of £30,000, on a telescope 54 feet in length with a tube 7 feet in diameter. A series of cranks, swivels, and pulleys enables this huge instrument to be handled almost with as much ease as telescopes of ordinary size. The sphere of observation was immensely widened by Lord Rosse's instrument, which has been chiefly used in observations of nebulæ.

Rosset'ti, GABRIEL CHARLES DANTE, better known as DANTE GABRIEL, painter and poet, was born in London in 1828, and died in 1882. His father, Gabriele Rossetti (1783–1854), a native of Italy and an Italian poet of considerable distinction, was a political refugee in London, where he became professor of Italian in King's College, and was known as an able though eccentric commentator upon Dante. His mother was Frances Polidori, sister of Byron's travelling physician. Dante Gabriel early showed a predilection for art, studied in the Royal Academy, then became a pupil of Ford Madox Brown; and in 1848 joined Holman Hunt, Thomas Woolner, Millais, and others in founding the so-called Pre-Raphaelite Brotherhood, to whose organ, the Germ, he contributed several poems. In 1849 he exhibited his painting of the Girlhood of Mary Virgin; but his later works, numerous as they were, were rarely seen by the public until the posthumous exhibition of a collection of his paintings in 1883 at the Royal Academy. Rossetti was a master of colour; but his drawing is subject to certain mannerisms, due perhaps to insufficient study from the life. He has moreover his own pronounced ideal type of feminine beauty, with which all critics do not find themselves in harmony. His principal paintings are: Dante's Dream, the Salutation of Beatrice, the Dying Beatrice, La Pia, Proserpine, Sibylla Palmifera, Monna Vanna, Venus Verticordia. Rossetti is even more famous as a poet; and his poems are characterized by the same vivid imagination, mystic beauty, and sensuous colouring as his paintings. In both arts he appears as a devotee of mediævalism. His chief poems are the House of Life, a poem in 101 sonnets; the King's Tragedy and other Ballads, Dante at Verona, Blessed Damozel, &c. In 1861 he published the Early Italian Poets, a series of translations in the original metres, afterwards reissued under the title of Dante and his Circle. His wife died in 1862, two years after marriage, and from this grief he never entirely recovered.—His sister, CHRISTINA GEORGINA (b. 1830, d. 1895), was a poetess of high merit. Her chief works are: Goblin Market and other Poems (1862), The Prince's Progress and other Poems (1866), The Pageant and other Poems (1881), besides prose stories, books for children, and several devotional works in prose and poetry. —His brother, WILLIAM MICHAEL (b. 1829), was long in the Inland Revenue Office, and has distinguished himself as an art-critic, editor, and writer of biography, &c.

Rossi'ni, GIOACHINO ANTONIO, Italian operatic composer, was born at Pesaro, Feb. 29, 1792; died Nov. 13, 1868. The son of a musician in humble life, he began to learn music very early, and by the kindness of a patron became a pupil in the Lyceum at Bologna. He wrote a great number of both comic and serious operas, the first successful one of which was Tancredi (1813), and enjoyed a high degree of reputation and wealth. In 1824 he visited London, and from 1824 till 1836 he resided at Paris, where he held, till 1830, a highly-salaried post in connection with the Théâtre des Italiens. He then spent some years at Bologna and Florence, but in 1855 he returned to Paris, where he died. His body was removed to Florence in 1887. Rossini effected in Italy the improvements in opera carried out by Mozart in Germany. He curtailed the long recitative parts of serious opera, promoted the basso to a leading part, made the orchestration livelier, and no longer left the ornamentation of his songs to the discretion of the singers. He is specially considered to be a master of melody. His finest opera is William Tell (1829). Other chief works are: Othello (1816), Moses in Egypt (1818), and Semiramide (1823); and the comic operas, the Barber of Seville (1816), and La Cenerentola (1817). He also composed a Stabat Mater (1842), a Missa Solennis (first performed 1869), and various cantatas, oratorios, and pianoforte pieces.

Roster, a military term signifying a list or register, showing or fixing the rotation in which individuals, companies, regiments, &c., are liable to serve.

Rostock, the largest town in Mecklenburg-Schwerin, Germany, is situated on the navigable Warnow, 7 miles S. of the Baltic Sea and 60 miles E.N.E. of Lübeck. A few relics of the picturesque mediæval town have survived the great fire of 1677. The chief buildings are the church of St. Mary (14th century), remarkable for the height of its roof; the town-house, with seven towers; the

palace, and the university (founded 1419). Rostock, with the fore-port of Warnemünde, carries on a fairly active export and import trade (largely with Britain), and is actively engaged in various industries. It was the birthplace of Blücher. Pop. 49,689.

Rostof. See *Rostov.*

Rostop'chin, Fedor Vasil'evich, Count, born in 1765 of an ancient Russian family, was governor of Moscow in 1812. Napoleon accused him in his despatches of having deliberately set fire to Moscow in that year; but he himself decidedly denied this charge in his Vérité sur l'Incendie de Moscou (Paris, 1823). It is at least certain that if Rostopchin did not cause the catastrophe, he fully expected it when he evacuated the city. In 1814 he was present at the Congress of Vienna. He died at Moscow in 1826, leaving behind him a number of historical memoirs, comedies, &c., in Russian and French.—His daughter-in-law, Evdokia Petrovna Rostopchin (1812–58), is distinguished in Russian literature as a poetess and novelist.

Rostov', or **Rostof',** a town in Russia, in the government of Jaroslav, and 35 miles S.S.W. of the town of Jaroslav, on Lake Nero. It is one of the oldest towns in Russia, being mentioned in the 9th century, has a cathedral and a very important annual fair. Pop. 12,454.

Rostov, or **Rostof,** a town of Southern Russia, in the province of the Don Cossacks, on the Don, about 20 miles above its mouth in the Sea of Azof. Its importance is due to the agricultural development of S. Russia, which has raised it in about a century from a mere village to a large town with important fairs, an extensive grain-shipping industry, and trade in wool, oil, tallow, ores, pitch, &c. Pop. 108,155.

Rostra, Rostrum, a platform or stage in the forum in Rome, whence the orators used to harangue the people; so called from the beaks (*rostra*) of the ships taken, in 338 B.C., from the Antiates, with which it was adorned.

Rot, a disease incident to sheep (sometimes to other animals), and caused by the presence in the gall-bladder and biliary ducts of the common liver-fluke (*Distŏma hepaticum*), developed from germs swallowed by the sheep with their food. The average length of the mature fluke is about 1 inch. Within the liver of a single sheep several dozens of these parasites may sometimes be found. The disease is promoted by a humid state of atmosphere, soil, or herbage. It has different degrees of rapidity, but is almost invariably fatal.

Rot, Dry. See *Dry-rot.*

Rota, a seaport in Spain, in Andalusia, opposite and 7 miles from Cadiz. It has trade in fruit and vegetables, and manufactures 'tent'-wine. Pop. 6972.

Rota Roma'na, the highest ecclesiastical court of appeal for all Christendom during the supremacy of the popes. With the dwindling temporal power of the popes it gradually lost all authority in foreign countries.

Rotation, in physics, is the motion of a body about an axis, so that every point in the body describes a circular orbit, the centre of which lies in the axis. It is thus distinguished from revolution, or the progressive motion of a body revolving round another body or external point. If a point, which is not the centre of gravity, be taken in a solid body, all the axes which pass through that point will have different moments of inertia, and there must exist one in which the moment is a maximum, and another in which it is a minimum. Those are called the *principal axes of rotation.* When a solid body revolves round an axis its different particles move with a velocity proportional to their respective distances from the axis, and the velocity of the particle whose distance from the axis is unity is the *angular velocity of rotation.*

Rotation of Crops, in agriculture and horticulture, is the system or practice of growing a recurring series of different annual crops upon the same piece of land. The system is based on the fact that different crops absorb different quantities of the various inorganic constituents of the soil, thus impoverishing it for crops of the same kind, but leaving it unimpaired, or even improved, for crops feeding upon other constituents. Different soils and climates require different schemes of rotation, but it is a tolerably universal rule that culmiferous or seed crops should alternate with pulse, roots, herbage, or fallow. The rotation of crops may be arranged in 'courses' or 'shifts' of any number of successive crops; 3, 4, or 5 years' courses are perhaps the commonest. In many leases in Great Britain the rotation is more or less strictly arranged between landlord and farming tenant.

Rotatoria. See *Rotifera.*

Rotche, Sea-dove, or Little Auk (*Mergŭlus melanoleucus*), an aquatic bird belong-

ing to the family of auks or Alcidæ, about the size of a large pigeon. It frequents the Arctic seas, and comes to land only during the breeding season. Its plumage is black on the back and wings, white on the breast.

Roth (rōt), Rudolf von, German Sanskritist, born in 1821, since 1856 professor of oriental languages at Stuttgart, as well as university librarian. His chief work is a great Sanskrit dictionary in collaboration with Böhtlingk (which see). Died in 1895.

Rothe (rō′tė), Richard, German Protestant theologian, born in 1799. From 1823 till 1828 he was chaplain to the Prussian embassy at Rome. He afterwards held various professorial posts at Wittenberg (1828–37), Heidelberg (1837–49), and Bonn (1849–54), and finally returned to Heidelberg, where he died in 1867. The work upon which his fame principally rests is his Theologische Ethik, a complete system of speculative theology, published in 1845–48 (2d ed. 1867–71), occupying a middle position between the rationalistic and orthodox schools of theology. According to Rothe the rational man is developed by the processes of animal evolution, but spirit is a super-physical development.

Rothenburg-ob-der-Tauber (rō′ten-bu̇rh; 'above the Tauber'), a town of Bavaria, in Middle Franconia, on a height above the Tauber, 29 miles S.S.E. of Würzburg. Its position is naturally strong, being on a promontory, and having a deep valley on two of its sides. The walls, towers of defence, and gateways are still complete as in the days of bows and arrows. The mass of the town may be said to date from 1560, but two churches and some private dwellings are of much earlier date. Altogether it is one of the most perfectly preserved examples of a small mediæval town. Pop. 6221.

Roth′erham, a municipal borough of England, in the West Riding of Yorkshire, 5 miles north-east of Sheffield, on the Don, at its junction with the Rother. The fine Perpendicular church dates from the time of Edward IV.; the grammar-school from 1483. Rotherham has an Independent college, and extensive iron-works and manufactures of iron goods, soap, glass, &c. Pop. 42,050. It gives name to a parl. div.

Rothesay (rōth′sā), a royal borough, seaport, and favourite watering-place of Scotland, chief town of the county of Bute, is beautifully situated at the head of a fine bay on the north-east of the island of Bute. Rothesay has little trade, though nominally the centre of a fishing district. Its prosperity in great measure depends upon its popularity as a health resort, and on the many visitors it receives during summer. Its climate is very mild in winter, and it is on that account often selected as a residence by pulmonary sufferers. Nearly in the centre of the town stands the ruined royal castle, supposed to have been originally built in 1098 by Magnus Barefoot of Norway. It was burned in 1685. Rothesay gives the title of duke to the Prince of Wales. Pop. 9034.

Rothschild (rōt′shilt; in English generally pronounced roths′child or ros′child), the name of a family of Jewish bankers, distinguished for their wealth and influence. The founder of the original banking-house was Mayer Anselm Bauer (1743–1812), a poor orphan, born in Frankfort-am-Main. Though educated as a teacher, Bauer entered a bank in Hanover, and finally saved sufficient capital to found a business of his own in the famous Judengasse of Frankfort, at the sign of the Red Scutcheon (Roth Schild), which afterwards gave name to the family. He gained the friendship of the Landgrave of Hesse, who appointed him his agent, and in 1802 he undertook his first government loan, raising ten million thalers for Denmark. At his death in 1812 he left five sons, the eldest of whom, Anselm Mayer von Rothschild (1773–1885), became head of the firm in Frankfort, while the others established branches at various foreign capitals: Solomon Mayer (1774–1855) at Vienna, Nathan Mayer (1777–1836) in London, Karl Mayer (1788–1855) at Naples, and Jacob (1792–1868) at Paris. These branches, though in a measure separate firms, still conduct their operations in common; and no operation of magnitude is undertaken by any without a general deliberation of all at Frankfort. The Naples branch was discontinued in 1860; the two sons of Karl Mayer (Mayer Karl, 1820–86, and Wilhelm Karl) succeeding their childless uncle Anselm at Frankfort. The bold, yet skilful and cautious operations of the Rothschilds during the troubled political years after 1813 confirmed the fortunes of the firm. Nathan Mayer in particular distinguished himself by his energy and resource. By means of special couriers, carrier-pigeons, swift sailing-boats, &c., he was frequently in possession of valuable information (*e.g.* the result of the battle of Waterloo) even before the government, and skilfully turned his advan-

tage to account. The Rothschilds do not contemn comparatively small operations; but they are chiefly famous for the enormous loans which they raise and manage for different European governments. In 1822 the five brothers were made barons by Austria; and in 1885 Baron Nathaniel von Rothschild (born 1840) was raised to the English peerage. Lionel Nathan (1808–79), the father of the last-named, was the first Jew who sat in parliament (1858); and various other members of the family have risen to positions of honour and dignity both in Britain and other countries.

Rotifera, Rotatoria, or Wheel Animalcules, a group of microscopic organisms, inhabiting both salt and fresh water, distinguished by the possession of an anterior disc-like structure (*trochal disc*), furnished with vibratile cilia or filaments and capable of being everted and inverted at will. The popular name of 'Wheel Animalcules' is derived from an apparent rotatory motion in the cilia which fringe the front disc. Rotifera are found both in a free swimming and a temporarily or permanently attached state; some are parasitic. The body is usually elongated and generally covered with a chitinous skin. The head region is well marked. A highly-specialized digestive system is usually developed, at least in the females. The nervous system is represented by a single ganglionic mass, on which pigment spots, supposed to be eyes, are generally visible. The sexes are found in different individuals; but the males are smaller, and in development entirely subsidiary to the females. Locomotion is carried on by means of the cilia of the trochal disc, which also serve to sweep particles of food towards the mouth. The first rotifer was discovered in 1702 by Leeuwenhoek; but Ehrenberg and later observers first differentiated them from infusoria and other minute forms of life. Some authorities class them as an aberrant subdivision of the scolecidæ or tapeworms, others as a subdivision of the annelida, and others connect them with the mollusca, or arthropoda.

Rotrou (ro-trö), Jean de, French dramatist, born 1609, died 1650. He was the author of thirty-five plays all deservedly popular, the best of which are Saint Genest, Venceslas, Don Bertrand de Cabrère, Antigone, Hercule Mourant, and Cosroes. He was patronized by Richelieu, and a friend of Corneille.

Rotteck, Karl Wenceslaus Rodecker von, a German historian and politician, was born at Freiburg in Baden in 1775. From 1798 till 1818 he was professor of history, and from 1818 till 1832 of law in the university of his native town. In 1819 he was chosen to represent the university in the upper house of legislature, and in 1831 he entered the lower chamber as a popular representative. His bold and uncompromising advocacy of liberal reform and political freedom drew on him the resentment of government and he lost his professorship, but maintained his seat in the legislature until his death in 1840. His best-known work is his Allgemeine Weltgeschichte (General History of the World).

Rottenburg, a town of Württemberg, on the Neckar, about 6 miles S.W. of Tübingen, has a Roman Catholic cathedral and an old castle (1216) of the counts of Hohenberg, now a prison. Pop. 7310.

Rotten-stone, a soft stone or mineral, called also *Tripoli*, from the country from which it was formerly brought. It is much used for polishing household articles of brass or other metal. Most of the rotten-stone of commerce is derived, like that of Derbyshire, from the decomposition of siliceous limestones, the lime being decomposed, and the silex remaining as a light earthy mass.

Rotterdam, the chief port and second city in Holland, is situated on the Nieuwe Maas or Meuse, at its junction with the Rotte, about 14 miles from the North Sea, with

which it is also directly connected by a ship canal (Nieuwe Waterweg) admitting the largest vessels and not interrupted by a single lock. The town is intersected by numerous canals, which permit large vessels to moor alongside the warehouses in the very centre of the city. These canals, which are crossed by innumerable drawbridges and swing-bridges, are in many cases lined with rows of trees; and the handsome quay on the river front, 1½ mile long, is known as the Boompjes ('little trees'), from a row of elms planted in 1615 and now of great size. Many of the houses are quaint edifices, having their gables to the street, with overhanging upper stories. The principal buildings are the town-hall, court-houses, exchange, old East India House, Boymans'

Church of St. Laurens, Rotterdam.—After Sir A. W. Calcott, R.A.

Museum, containing chiefly Dutch and modern paintings, and the government dockyards and arsenal, besides the numerous churches, of which the most conspicuous is the Groote Kerk, or church of St. Lawrence (15th century). The Groote Markt has a statue of Erasmus, a native of the town; and there are fine parks and a large zoological garden. Rotterdam contains ship-building yards, sugar-refineries, distilleries, tobacco-factories, and large machine works; but its mainstay is commerce. It not only carries on a very extensive and active trade with Great Britain, the Dutch East and West Indies, and other transoceanic countries, but, as the natural outlet for the entire basin of the Rhine and Meuse, it has developed an important commerce with Germany, Switzerland, and Central Europe. The Maas is crossed by a great railway-bridge and another for carriages and foot-passengers. Rotterdam received town rights in 1340, and in 1573 it obtained a vote in the Estates of the Netherlands; but its modern prosperity has been chiefly developed since 1830. The adjacent town of Delfshaven was incorporated with it in 1886. The pop. is now 276,337.

Rotti, or ROTTEE, one of the Dutch Sunda Islands, separated from the S.W. end of Timor by the Rotti Strait, 5 miles wide; area, 385 sq. miles; pop. about 70,000, ruled by native chiefs under the Dutch resident.

Rot'tlera, a genus of tropical bushes or moderate-sized trees, nat. order Euphorbiaceæ. *R. tinctoria* affords a dye. See *Kamala*.

Rottweil (rot'vil), a town of Württemberg, on the Neckar, 49 miles S.S.W. from Stuttgart. It was an ancient free town of the empire. Pop. 6052.

Rotu'mah, an island of the Pacific, nearly 300 miles N.N.W. of Fiji, 4 to 5 miles wide and about 16 long; hilly, of volcanic origin, and generally fertile, producing cocoa-nuts in especial perfection. It was ceded to Britain by the native chiefs in 1879, and is governed by a commissioner as a dependency of the Fiji group. The natives are now Christians, and number about 2600.

Roubaix (rö-bā), a town of France, department Nord, 6 miles N.E. of Lille, is a highly important seat of the French textile industry, remarkable for its rapid growth, most of it being not more than fifty years old. Woollens, cottons, and silk or mixed stuffs are chiefly made; also beet-sugar, machinery, &c. In 1804 it had 8700 inhabitants; in 1896, 124,977.

Roubillac (rö-bi-yak), Louis François, French sculptor, was born at Lyons in 1695, and settled in England in the reign of George I. In the dearth of native talent which prevailed at that period he long stood at the head of his profession. He executed a number of monuments in Westminster Abbey, the most remarkable being that of Mrs. Nightingale. He also produced statues of Handel, Shakspere, Sir Isaac Newton, George II., and a large number of portrait busts. He had much skill in portraiture, but his figures are often marred by striving after dramatic effect. He died in London in 1762.

Rouble, a silver coin, the standard of money in Russia, with a legal weight (since Jan. 1st, 1886) of 19·99 grammes, equal to about 3*s.* 2*d.* of British money. A rouble is divided into 100 copecks. Half and quarter roubles and smaller silver coins are also issued; but in actual circulation there is little but paper-money, current at about 30 per cent below its nominal value. The gold imperial is worth 10 roubles, the half-imperial 5 roubles.

Rouen (rö-äṅ), the old capital of Normandy, now chief town of department Seine-Inférieure, in France, is situated on the Seine, 80 miles from the sea and 87 miles N.N.W. of Paris. It is the seat of an archbishop, and the fourth port in France. In its older parts the streets are narrow, picturesque, and ill-built, but interesting to the lover of mediæval architecture. The cathedral, erected in the 13th–15th centuries, is one of the finest Gothic monuments in Normandy, though it is surpassed in beauty by the exquisite church of St. Ouen, begun in 1318 and finished at the close of the 15th century. St. Maclou (15th century) is a fine example of florid Gothic. Among the secular buildings are the Palais de Justice (late 15th century), exuberant in decoration; the Hotel de Ville, formerly a part of the monastery of St. Ouen; the Hotel de Bourgthéroulde (15th century), with fine reliefs; the archbishop's palace; and the distinctive Tour de la Grosse-Horloge (1389). The new Musée, built in 1888, contains a large collection of paintings, chiefly of the French school. The municipal library has 120,000 volumes and 2500 MSS. Rouen is a busy trading place, and has important manufactures of *rouenneries* (a kind of coarse striped or checked fabric) and other cotton goods. It has also manufactures of chemicals, beetroot-sugar, earthenware, confectionery, &c.; and bleach-fields, dye-works, foundries, &c. The channel of the Seine has been deepened and regulated, so that vessels of 23 feet draught can ascend to the extensive harbour and docks. Rouen is the Rotomagus of Roman times. In the 9th century it became the capital of the Northmen or Normans; and after the Norman Conquest it remained in the possession of England till 1204. The English retook it in 1418, but finally lost it in 1449. In 1431 it was the scene of the trial and execution of Joan of Arc. Corneille, Fontenelle, Géricault, and other famous men were natives of Rouen. Pop. 112,165; or including the faubourgs, 160,000.

Rouge (rözh), a very fine scarlet powder, used by jewellers for polishing purposes, and prepared from crystals of sulphate of iron exposed to a high temperature. The name is also given to a cosmetic prepared from safflower (which see).

Rouge Croix (rözh krwä), Rouge Dragon, pursuivants of the English Herald's College, the first so called from the red cross of St. George; the second from the red dragon, the supposed ensign of Cadwaladyr, the last king of the Britons. See *Pursuivant*.

Rouge-et-Noir (rözh-é-nwär; Fr. 'red and black'), Trente-Un (trãṇt-ũṅ; 'thirty-one'), or Trente et Quarante (trãṇt-é-kà-rãṇt; 'thirty and forty'), a modern game of chance played with the cards belonging to six complete packs. The punters or players stake upon any of the four chances: *rouge*, *noir*, *couleur*, and *inverse*. The banker then deals a row of cards for noir, until the exposed pips number between 30 and 40 (court-cards count 10, aces 1), and a similar row for rouge. That row wins which most

nearly approaches the number 31, and players staking on the winning colour receive their stake doubled. *Couleur* wins if the first card turned up in the deal is of the winning colour; in the contrary case *inverse* wins. When the number of pips in both rows are equal it is a *refait*, and a fresh deal is made; but if both happen to count exactly 31 it is a *refait de trente-et-un*, and the banker claims one-half of all stakes. This last condition places the banker at an advantage calculated to be equal to about 1¼ per cent on all sums staked.

Rouget de Lisle. See *Marseillaise Hymn.*

Roulers (rö-lār; Flemish, *Rousselaere*), a town of Belgium, in West Flanders, on the Mandel, 17 miles south of Bruges. The chief industrial establishments are cotton and woollen factories; and it has an important linen-market. Pop. 17,814.

Roulette (rö-let'; Fr. 'little wheel'), a game of chance, in which a small ivory ball is thrown off by a revolving disc into one of 37 or 38 compartments surrounding it, and numbered from 1 to 36, with one or two zeros. Players who have staked upon the number of the compartment into which the ball falls receive thirty-six times their stake; less if they have staked upon more than one number. There are also other chances on which stakes may be placed.

Rouma'nia, a European kingdom, bounded by Austria-Hungary, Servia, Bulgaria, the Black Sea, and Russia; area, 50,760 sq. miles. It includes the former Danubian principalities of Walachia and Moldavia and the province of the Dobrudsha on the Black Sea. Pop. 5,500,000. The capital is Bukarest; other chief towns are Jassy, Galatz, Braïla, and Giurgevo. The surface is mainly occupied by undulating and well-watered plains of great fertility, gradually sloping upwards to the Carpathians on the N. and W. borders, where the summits range from 2650 to 8800 feet above sea-level. The entire kingdom is in the basin of the Danube, which has a course of 595 miles in Roumania, forming the boundary with Bulgaria nearly the whole way. Its chief Roumanian tributaries are the Olta or Aluta, Ardjis, Jalomitza, Sereth, and Pruth (on N.W. border). The Danube forms a number of marshy lakes as it approaches the alluvial region of the Dobrudsha, through which it discharges itself into the Black Sea by the St. George, Sulina, and Kilia channels. The climate is much more extreme than at the same latitude in other parts of Europe; the summer is hot and rainless, the winter sudden and very intense; there is almost no spring, but the autumn is long and pleasant. Roumania is an essentially agricultural and pastoral state, fully 70 per cent of the inhabitants being directly engaged in husbandry. The chief cereal crops are maize, wheat, barley, rye, and oats; tobacco, hemp, and flax are also grown; and wine is produced on the hills at the foot of the Carpathians. Cattle, sheep, and horses are reared in large numbers. Excellent timber abounds on the Carpathians. Bears, wolves, wild boars, large and small game, and fish are plentiful. The country is rich in minerals of nearly every description, but salt, petroleum, and lignite are the only minerals worked. Manufactures are still in a rudimentary state.

Trade, Railways, &c. — Trade is fairly active, but is almost entirely in the hands of foreigners; the internal trade is chiefly carried on by Jews, whose numbers and prosperity are constant sources of anxiety to Roumanian statesmen, and who are in consequence subject to certain disabilities. The chief exports are grain (especially maize), cattle, timber, and fruit; the chief imports manufactured goods, coal, &c. Germany, Great Britain, and Austria-Hungary appropriate by far the greatest share of the foreign trade, the bulk of which passes through the Black Sea ports. In 1894 the exports were valued at £11,767,935, the imports at £16,885,691. In 1895 the exports to Britain amounted to £2,118,505, chiefly maize, barley, and wheat. The imports from Britain direct were £944,034. Railways, begun in 1869, have a total length of 1700 miles, nearly all in the hands of government, which also monopolizes salt and tobacco. The French decimal coinage has been introduced, the franc being called *leu* (pl. *lei*), the centime *bani*. The metric system of weights and measures has also been officially recognized, but a bewildering diversity of local standards is still common.

People.—The Roumanians, who call themselves *Romani*, claim to be descendants of Roman colonists introduced by Trajan; but the traces of Latin descent are in great part due to a later immigration, about the 12th century, from the Alpine districts. Their language and history both indicate that they are a mixed race with many constituents. Their language, however, must be classed as one of the Romance tongues, though it contains a large admixture of

foreign elements. In Roumania there are about 4,500,000 Roumanians, 400,000 Jews, 200,000 gypsies, 100,000 Bulgars, 50,000 Magyars, 50,000 Germans, 15,000 Greeks, and 15,000 Armenians. Three-fourths of

Roumanian Peasants.

the population are peasants, who until 1864 were kept in virtual serfdom by the boiars or nobles. In that year upwards of 400,000 peasant families were made proprietors of small holdings averaging 10 acres, at a price to be paid back to the state in fifteen years. About 4½ millions of the people belong to the Greek Church. Energetic efforts are being made to raise education from its present low level. Roumania has two universities (at Bukarest and Jassy), several gymnasia, and a system of free primary schools, at which attendance is compulsory.

Government, &c.—Roumania is a hereditary constitutional monarchy, with a bicameral legislature. The senate consists of various dignitaries and officials and 110 elected members; the chamber of deputies has 183 members, elected by all citizens paying taxes or possessed of a certain standard of education. The constitution, revised in 1884, closely resembles that of Belgium. The king is assisted by a ministry of eight members. The army is modelled on the German system, service being compulsory from the age of 21 to 46. The standing army has a peace strength of 1300 officers and 45,000 men, with 192 cannon. In addition are the territorial army (67,000 men), the militia (47,700 men), and the *glota* or *levée en masse*. The navy consists of 21 vessels, mostly small. Every Roumanian between the ages of seventeen and forty-six is liable to serve in one or other of the above bodies. For 1896–97 the revenue was estimated at £8,400,000, the expenditure at the same. In 1896 the public debt was nearly £50,000,000, about half being incurred for railways and other public works.

History.—The country that is now Roumania was anciently part of Dacia, which was conquered by Trajan and made a Roman province in 106 A.D., a great many Roman colonists being then settled in it. In the 3d century it was overrun by the Goths, and subsequently by Huns, Bulgars, Avars, and Slavs, all of whom have left more or less distinct traces on the land and people. At the beginning of the 9th century Roumania formed part of the great Bulgarian kingdom, after the fall of which in 1019 it nominally belonged to the Eastern Roman Empire, although soon taken possession of by Turkish tribes. Walachia and Moldavia were long divided. About 1241 Radu Negra, 'duke' of Fogeras, is said to have founded a voivodeship in Walachia, which finally fell under Turkish supremacy after the battle of Mohacs in 1526. The boiars retained the nominal right of electing the voivodes until 1726; but thenceforward the sultan openly sold the office to the highest bidders, who, without security of tenure, mercilessly plundered the unfortunate province so long as their power lasted. In Moldavia, Dragosh or Bogdan about 1354 founded a kingdom, much as Radu had done in Walachia, and it too fell under the overlordship of the Porte after the death of the voivode Stephan the Great in 1504. The Turks subsequently introduced the same custom of selling the hospodarship or voivodeship. In both provinces the government was most frequently purchased by Phanariotes, Greek inhabitants of the Phanar district of Constantinople. The successive wars between Russia and Turkey, the first of which began in 1768, were on the whole beneficial to Roumania, for the Russians gradually established a kind of protectorate over their fellow-Christians on the Danube. The Treaty of Paris in 1856, after the Crimean war, confirmed the suzerainty of

the Porte, but preserved the rights and privileges of the Danubian principalities, and added to them part of Bessarabia. In 1858 the two provinces, each electing Colonel Couza as its hospodar, were united by a personal union, which in 1861 was formally converted into a real and national union. Couza, who assumed the title of Prince Alexander John I. in 1860, was forced by a revolution to abdicate in 1866, and Prince Charles of Hohenzollern-Sigmaringen, the present Carol I., was elected in his place. In the Russo-Turkish war of 1877–78 Roumania sided with Russia, and proclaimed its independence of Turkey. This claim was recognized by the Treaty of Berlin in 1878, but Roumania was compelled to retrocede to Russia the part of Bessarabia acquired in 1856, and to receive the Dobrudsha in exchange. In 1881 Roumania declared itself a kingdom. The Crown Prince married Princess Marie of Edinburgh in 1893.

Roumelia. See *Rumelia.*

Round, in music, a short composition in which three or more voices starting at the beginning of stated successive phrases, sing the same music in unison or octave (thus differing from the canon).

Roundelay, a sort of ancient poem, consisting of thirteen verses, of which eight are in one kind of rhyme and five in another. It is divided into couplets, at the end of the second or third of which the beginning of the poem is repeated.

Rounders, a game played with a bat and a ball by two parties or sides, on a piece of ground marked off into a square or circle, with a batter's station and three goals all at equal distances. On the ball being thrown towards him the batter tries to drive it away as far as he can and run completely round the goals, or over any one of the four parts, before the ball can be thrown back to the batting station. The batter is declared out if he fails to secure a run after having had three balls, if a fielder returns the ball so as to strike him while running, or if the ball from his bat is caught in the air by one of the fielders. See *Base-ball,* to which this game is similar.

Round-fish, a fish (*Coregŏnus quadrilaterālis*) of the salmon family, found in many of the lakes and rivers of the northern U. States and Canada. When in good condition it is very fat and of exquisite flavour, weighing about 2 lbs.

Roundheads, a name formerly given by the Cavaliers or adherents of Charles I., during the English civil war, to members of the Puritan or parliamentary party, who distinguished themselves by having their hair closely cut, while the Cavaliers wore theirs in long ringlets.

Round Robin, a written protest or remonstrance, signed in a circular form by several persons, so that no name shall be obliged to head the list. This method of bringing grievances to the notice of superiors was first used by French officers, whence its derivation from *rond ruban,* 'round ribbon.'

Round Table, The, famous in the Arthurian legends, a table for the accommodation of a select fraternity of knights, said to have been established by Uther Pendragon, father of King Arthur, and when it was complete to have had 150 knights of approved valour and virtue. King Leodegraunce, who received it from Uther Pendragon, was father of Guinevere, and assigned it as part of her dowry when she wedded Arthur. The fellowship of the Round Table met for the last time just before setting out on the quest for the holy graal. There are other accounts of the founding of the table, one of which ascribes it to Arthur himself, who admitted only 12 knights to it. All, however, unite in describing it as the centre of a fellowship of valiant, pious, and noble knights. First mention of it is made in the Brut of Wace.

Round Towers, a class of tall narrow

Round Tower on Devenish Island, Fermanagh.

circular edifices, tapering somewhat from the base upwards, and generally with a

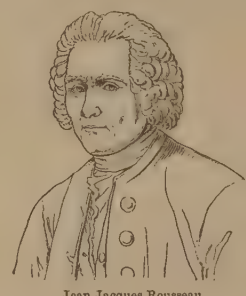
conical top, from 60 to 130 feet in height, and from 20 to 30 in diameter. With the exception of three in Scotland, they are peculiar to Ireland. The doors are from 6 to 20 feet from the ground, the windows small. The interior contained no stairs, but the successive stories were reached, like the doors, by means of ladders. Authorities are now pretty well agreed that these towers were the works of a Christianized race, erected as places of refuge and as watch-towers. They date from the 8th or 9th to the 13th century.

Round-worms. See *Nematelmia.*

Rousay, or Rowsa, one of the Orkney Islands, 5¼ miles long by 4½ miles broad, and 10 miles N. of Kirkwall. Pop. 774.

Rousseau (rö-sō), Jean Baptiste, French poet, born at Paris in 1670. His quarrelsome disposition and turn for ill-natured satire involved him in almost constant trouble, and he was condemned to exile in 1712 for contumacy in refusing to appear before the law courts. He spent the remainder of his life chiefly in Vienna and the Netherlands, and died at Brussels in 1741. His works consist of sacred and secular odes, cantatas, epigrams, operas, comedies, epistles, &c.

Rousseau, Jean Jacques, one of the most celebrated and most influential writers of the 18th century, was the son of a watchmaker at Geneva, where he was born in 1712. For the first thirty-five years of his life the chief authority is his own painfully frank, but perhaps not absolutely accurate Confessions, first published in 1782 and 1789. His youth gave little promise of his future eminence, and after a desultory education he was apprenticed in 1725 to an engraver, from whose real or fancied severity he ran away in 1728. He now fell under the notice of Madame de Warens, a lady residing at Annecy, who sent him to a Roman Catholic institution at Turin, where he abjured Protestantism. After several fits of eccentric wandering he went to live with Mme. de Warens at Les Charmettes, a country-house near Chambéry, where they appear to have lived happily for nearly three years. From a short absence at Montpellier, however, Rousseau returned to find his place at Les Charmettes occupied by another, whereupon he departed to become a tutor at Lyons. In 1741 he went to Paris, and in 1743 obtained the post of secretary to the French ambassador at Venice. This office he threw up, and returned to Paris in 1745, to lead a precarious life, copying music and studying science. About this time he became intimate with Diderot, Grimm, D'Holbach, Mme. D'Epinay, &c., and contributed to the Encyclopédie; and from this period



Jean Jacques Rousseau.

also dated his connection with Thérèse le Vasseur, with whom, five-and-twenty years later, he went through some form of marriage ceremony. In 1750 his essay, in which he adopted the negative side of the question whether civilization has contributed to purify manners, won a prize offered by the Academy of Dijon, and brought him for the first time into general notice. In 1752 he brought out a successful operetta (the music by himself), and soon after a celebrated Letter on French Music. In 1754 he revisited Geneva, where he was readmitted a free citizen on once more embracing Protestantism. Having returned to Paris he wrote a sort of novel, Julie ou La Nouvelle Héloïse, which was published in 1760, being followed by Le Contrat Social, a political work, and Émile ou de l'Education, another story, in 1762. The principles expressed in these works stirred up much animosity against their author. The confession of faith of the Savoyard vicar in Émile was declared a dangerous attack upon religion, and the book was burned both in Paris and Geneva. Persecution, exaggerated by his own morbid sensibility, forced Rousseau to flee to Neufchâtel, then to the Île St. Pierre in the Lake of Bienne, and finally to England, where he was welcomed by Hume, Boswell, and others in 1766. A malicious letter by Horace Walpole unluckily roused his suspicions of his English friends, and in May 1767 he returned to France, where his presence was now toler-

ated. He lived in great poverty, supporting himself by copying music and publishing occasional works. In May 1778 he retired to Ermenonville near Paris, where he died in the following July, not without suspicion of suicide. His celebrated Confessions appeared at Geneva in 1782. Rousseau united an enthusiastic passion for love and freedom with an inflexible obstinacy and a strange spirit of paradox. His life was clouded by a gloomy hypochondria, often developing into suspicion of his truest friends, and embittered by an unreasonable sensitiveness, which some have described as almost actual insanity. The chief importance of his works lies perhaps in the fact that they contain the germ of the doctrines which were carried out with such ruthless consistency in the French revolution. Rousseau was also a musical author and critic of some importance.

Roussette (rö-set'), a name sometimes applied to the frugivorous bats generally.

Roussillon (rö-sē-yōn), a former province of France, now occupied by the department of the Pyrénées Orientales. It gave name to a family of counts.

Rove-beetles, or COCKTAILS, the popular name of certain beetles. The common species is the *Ocypus olens*, the black cocktail, or 'devil's coach-horse.' These beetles are carrion-feeders.

Rovere'do, a town of Austria, in Tyrol, 34 miles north of Verona, on the Leno, near its junction with the Adige. It is an important centre of the Austrian silk manufacture and silk trade. Pop. 8864.

Rovigno (ro-vēn'yō), a seaport of Austria, on the S.W. coast of Istria, 40 miles south of Trieste; has two harbours, and a considerable shipping trade. The cathedral dates from the 11th century. Pop. 9522.

Rovi'go, a town in Italy, 23 miles S.W. of Padua, capital of a province of its name, on the Adigetto, an arm of the Adige. The town-house contains a picture-gallery and a library of 80,000 vols. There is a handsome court-house and two leaning towers belonging to a castle erected in the 10th century. Pop. 7272. The province has an area of 651 sq. miles; pop. 217,700.

Rovu'ma, a river of East Africa, which rises on the E. of Lake Nyassa, and flows nearly due E., with a course of about 500 miles, to the Indian Ocean. The Rovuma is not well adapted for navigation. It marks the boundary between the territory of Germany and Portugal.

Rowan-tree, ROAN-TREE, or MOUNTAIN-ASH (*Pyrus Aucuparia*), nat. order Rosaceæ, is a native of Europe and Siberia, common in Britain, particularly in the Highlands. Its leaves are pinnate, leaflets uniform, serrated, glabrous. It has numerous white flowers in corymbs. The fruit consists of clusters of small red berries, bitter to the taste. The tree attains a height of from 20 to 40 feet, and affords timber much used by toolmakers and others. The bark is used by tanners and the berries yield a dye. The rowan-tree was formerly regarded as an object of peculiar veneration, and a twig of it was supposed to be efficacious in warding off evil spirits. It is also called *quicken-tree* and *quick-beam*.

Rowe (rō), NICHOLAS, an English dramatic poet, born in 1673 at Little Barford, Bedfordshire, was the son of a serjeant-at-law. He was a king's scholar at Westminster under Dr. Busby, studied law at the Middle Temple, but on his father's death devoted himself to literature. He filled several lucrative posts, and in 1715 he was made poet-laureate in succession to Nahum Tate. He died in 1718, and was buried in the Poets' Corner in Westminster. Rowe's tragedies are passionate and forcible in language, and his plots well conceived. His minor pieces are unimportant, but his translation of Lucan's Pharsalia has been deservedly praised. His best plays are the Fair Penitent and Jane Shore; others are the Ambitious Stepmother, Tamerlane, Ulysses, the Royal Convert, and Lady Jane Grey. Her comedy of the Biter was a failure.

Rowing is the art of propelling a boat by means of oars, which act as levers of the second order, the work being done between the power (*i.e.* the rower) and the fulcrum (*i.e.* the water, of which the actual displacement is very slight). That part of the operation during which the power is actually being applied, *i.e.* when the oar is in the water, is specifically called the stroke; while feathering is the act of turning the blade of the oar so as to be parallel to the surface of the water, and carrying it thus through the air into position to repeat the stroke. Much skill is required to perform these operations satisfactorily; and in fact rowing can be learned only from observation and practice. Technically the word 'rowing' is used by boating-men only when each oarsman has but a single oar; when he has one in each hand he is said to 'scull,' and the oars are called 'sculls.' Although rowing is certainly one of the most ancient methods of

propelling vessels, it has only comparatively recently come into prominence as a form of sport. Boat-racing practically dates from the first quarter of the 19th century, and its development has lain almost entirely in the hands of the Anglo-Saxon races. The Thames has always been the leading resort of amateur oarsmanship, which had attained some little vigour before the first boat-race between Oxford and Cambridge Universities took place in 1829. The second took place in 1836; and since 1856 the contest has been annual, the course (since 1864) being from Putney to Mortlake, about 4½ miles. Of the very numerous amateur regattas which are held all over Great Britain, the chief is that at Henley-on-Thames, held annually since 1839. In Great Britain rowing affairs for amateurs are now generally conducted under the rules of the Amateur Rowing Association, founded in 1879, and recognized by all the chief clubs. In the United States the first amateur rowing-club was founded in 1834, but the sport did not make much progress until the Universities of Yale (in 1843) and Harvard (in 1844) took it up, followed by other universities. Yale and Harvard have competed annually since 1878. The chief regatta is held on different courses in different years by the National Association of Amateur Oarsmen, founded in 1873. Holland, Germany, and other countries have rowing clubs of importance; and foreign oarsmen have competed from time to time at British regattas, without, however, great success. The oldest established boat-race in England is that for Doggett's coat and badge, founded by Doggett the comedian in 1715, and still competed for on the Thames by young watermen. But races for 'championships' among professional oarsmen really began on the Thames in 1831, and are practically restricted to sculling-races. Racing-boats are called eight-oared or 'eights,' 'fours,' 'pairs,' &c., according to the number of rowers. 'Sixes' and 'double-scullers' are commoner in America than in Great Britain. The use of outriggers was introduced about 1844, that of sliding-seats, an American invention, about 1871.

Rowley Regis, a town of Staffordshire, England, partly within the parliamentary borough of Dudley, and engaged in similar industries. Pop. 30,791.

Rowlock, a contrivance on a boat's gunwale on which the oar rests in rowing; as, a notch in the gunwale, two short pegs, an iron pin, &c.

Roxa'na. See *Alexander*.

Roxburgh, ROXBURGHSHIRE, or TEVIOTDALE, an inland border county of Scotland, is bounded by Dumfries, Cumberland and Northumberland, Berwick, Midlothian and Selkirk. Total area, 428,493 acres, of which about 190,000 are under crops. The Cheviot Hills stretch along the s. border, where the loftiest summit is Auchopecairn (2382 ft.). The chief river is the Teviot, a tributary of the Tweed, which also traverses part of the county. The minerals are unimportant, though limestone and sandstone are abundant. Roxburghshire is chiefly occupied by valuable sheep walks, but its arable farms are also among the best in Scotland. The important woollen manufacture is confined to the towns, of which the chief are Hawick (the county town, and much the largest), Jedburgh, Kelso, and Melrose. The county returns one member to parliament. Pop. 53,442.

Roxburghe Club, a society called after John, the third duke of Roxburgh, whose celebrated library was sold by auction in London in 1812. The prices paid for some works were enormous; the highest (£2260) was paid for a first edition of Boccaccio. The object of the society was to print MSS. and rare works for the use of the members only, who originally numbered thirty-one, afterwards increased to forty. About ninety works have thus been issued. The club gives name to a style of binding books, namely, in half-leather with gilt tops.

Roxbury, a town in the United States, since 1867 incorporated with Boston (which see).

Roy, WILLIAM, antiquarian and geodesist, was born in 1720, near Lanark in Scotland; died 1790. He entered the army and attained the rank of major-general. In 1746 he made the survey of Scotland afterwards known as the 'Duke of Cumberland's Map;' and in 1784 he measured a base-line on Hounslow Heath, for the ordnance survey of England. He afterwards directed the observations for connecting the English triangulation with the French. His chief literary work is The Military Antiquities of the Romans in Scotland (folio, 1793).

Royal Academy. See *Academy*.

Royal Academy of Music, an institution established in London, in 1823, to provide a first-class musical education in all branches of the art, especially to professional students. It was incorporated by royal charter in 1830. It receives a grant of £500 per annum from

government, but is mainly supported by fees. Its early history was somewhat chequered, but since a reconstruction in 1868 it has been highly prosperous. It confers the title of Licentiate, Associate, and Fellow.

Royal Commission. See *Commission.*

Royal Family, in its widest sense, as referring to Great Britain, embraces all the British descendants of the royal house; in its narrower sense it includes only the queen-consort and queen-dowager, with all the lineal descendants of the sovereign. The husband of a queen-regnant is not as such a member of the royal family. The members of the royal family have precedence before all peers and officers of state; but an heir-presumptive has no rank or precedence as such, as his position may be altered by the birth of an heir-apparent. Payment is made annually out of the consolidated fund to the queen of £385,000, of which £60,000 goes to the privy-purse. The Prince of Wales, besides the revenues of the Duchy of Cornwall, has an annuity of £40,000, and the Princess of Wales £10,000, to be increased to £30,000 in case of her widowhood. In 1889 an additional annual grant of £36,000 was made for behoof of the children of the Prince of Wales. The other members of the royal family are paid annually as follows:—The Duke of Edinburgh, £10,000 (formerly £25,000); the Duke of Connaught, £25,000; Empress Frederick of Germany (Princess Royal), £8000; Princess Christian of Schleswig-Holstein, Princess Louise (Marchioness of Lorne), Duchess of Albany, and Princess Beatrice of Battenberg, £6000 each; the Duke of Cambridge, £12,000; Duchess of Teck, £5000; and the Grand-duchess of Mecklenburg-Strelitz, £3000. See *Queen, Prince of Wales,* and *Royal Marriage Act.*

Royal Household, those persons who hold posts in connection with the household of the British sovereign, including the keeper of the privy-purse and private secretary, lord steward, treasurer, comptroller, master of the household, lord chamberlain, vice-chamberlain, master of the horse, captains of the gentlemen-at-arms and yeomen of the guard, master of the buck-hounds, earl-marshal, grand falconer, lord high almoner, hereditary grand almoner, mistress of the robes, ladies of the bedchamber, bedchamber-women, maids of honour, lords-in-waiting, master of ceremonies, physicians in ordinary, poet-laureate, &c.

Royal Institution of Great Britain, founded in 1799, incorporated by royal charter in 1800, for diffusing knowledge and facilitating the general introduction of mechanical inventions, and for teaching the application of science to the common purposes of life. The members are elected by ballot, and pay an admission fee and annual subscription. The buildings at Albemarle St., Piccadilly, London, contain a laboratory, library, and museum, and among the lecturers occur the names of Dr. Thomas Young, Sir Humphry Davy, Faraday, Tyndall, Lord Rayleigh, Huxley, Carpenter, and other eminent men.

Royal Marriage Act, an act (12 Geo. III. cap. xi.) passed by the British parliament in 1772, which forbids all descendants of George II., other than the issue of princesses married into foreign families, to contract marriage without the consent of the sovereign, signified under the great seal. But such descendants, if above the age of twenty-five, may dispense with the consent of the crown, unless both houses of parliament expressly declare their disapproval within twelve months after notice of the intended marriage has been given to the privy-council. Marriages otherwise entered into are void.

Royal Naval Volunteers. See *Naval Reserve.*

Royal Society (London), The, the oldest learned society out of Italy, was founded for the study and promotion of natural science. It owes its origin to a club of learned men who were in the habit of holding weekly meetings in London as early as 1645, but the year 1660 is generally given as the year of its foundation. Charles II. took much interest in the proceedings of the society, and in 1682 granted a charter to the 'President, Council, and Fellows of the Royal Society of London for Improving Natural Knowledge.' Lord Brouncker was first president of this incorporated Royal Society. Meetings are held weekly from November to June for the purpose of reading and discussing scientific papers; and the more important of these are published in the annual Philosophical Transactions, first issued in 1665, and now forming a most valuable series. Accounts of the ordinary meetings, with abstracts of papers, &c., appear also in the periodical Proceedings, begun in 1800. Scientific research has at all times been both initiated and encouraged by the Royal Society, and many of the most important scientific achievements and discoveries have been due to its enlightened

methods. It deservedly enjoys an influential and semi-official position as the scientific adviser of the British government, and not only administers the £4000 annually voted by parliament for scientific purposes, but has given suggestions and advice which have borne valuable fruit, from the voyage of Capt. Cook in the *Endeavour* in 1768 down to the *Challenger* expedition, more than a century later. The society has an independent income from property of less than £5000, besides the annual subscriptions of £4 from each fellow. It awards the Copley, Davy, and two royal medals annually, and the Rumford medal biennially, for distinction in science; the first being the blue riband of scientific achievement, and bestowed both on foreign and British savants. The Royal Society met in Gresham College until 1710, with the exception of eight years after the great fire of London in 1666, when they found a welcome in Arundel House from Henry Howard, who presented his learned guests with the library purchased by his grandfather, Earl of Arundel, thus forming the nucleus of the present valuable library of the Royal Society, which contains about 50,000 volumes. From 1710 till 1780 the meetings of the society were held in Crane Court, thereafter in Somerset House, and finally since 1857 in its present quarters at Burlington House. The roll of the Royal Society contains practically all the great scientific names of its country since its foundation. Among its presidents have been Samuel Pepys, Sir Isaac Newton, Sir J. Banks, Sir Hans Sloane, Sir Humphry Davy, Prof. Huxley, and Lord Kelvin.

Royal Society (EDINBURGH), a society founded and chartered in 1783 for the promotion of all branches of physical and literary research, but now almost wholly engrossed with physical science. Its meetings are held twice a month from November to June, and the more important papers then read are published in the quarterly Transactions, and abstracts of them in the occasional Proceedings. The society receives £300 annually from government, but its chief funds are derived from the subscriptions of the fellows. It meets in apartments leased from government in the Royal Institution buildings. The library is chiefly scientific. The chief promoter of the society was Principal Robertson, the historian; among its early members were Hume, Reid, Edmund Burke, Hutton, Dugald Stewart, and James Watt; and among its presidents have been Sir Walter Scott, Sir David Brewster, the Duke of Argyll, Lord Moncreiff, and Lord Kelvin.

Royal University of Ireland, an institution founded in 1880 in pursuance of the provisions of the University Education (Ireland) Act, 1879, to take the place of the Queen's University, a similar institution established in connection with the Queen's Colleges (which see). The Royal University corporation consists of a chancellor, a senate, and graduates, the government being vested in the chancellor and senators, the latter not to exceed thirty-six in number. It has power to confer all such degrees and distinctions as are conferred by any university in the United Kingdom except in theology, and these may be bestowed on all male and female students who have matriculated in the university and passed the prescribed examinations, no residence in any college or attendance at any course of instruction in the university being obligatory on any candidate for a degree other than a degree in medicine or surgery, the university in this respect resembling that of London. An act of 1881 provided for the payment of £20,000 a year out of the surplus funds of the Irish Church for the purposes of the university, which has its seat at Earlsfort Terrace, Dublin. The university has a considerable staff of examiners, but of course no professors. A certain number of exhibitions and scholarships are conferred on those who pass examinations with high distinction.

Royan (rwâ-yän), a seaport and bathing town of France, dep. Charente-Inférieure, at the mouth of the Gironde. Pop. 5629.

Royat-les-Bains (rwâ-yâ-lā-bañ), a popular bathing place of Central France, dep. Puy-de-Dôme, charmingly situated a short distance from Clermont, 1380 feet above the sea, with warm springs, rich in bicarbonate of soda and common salt. Pop. 1200.

Royer-Collard (rwâ-yā-kol-är), PIERRE PAUL, a French philosopher, born in 1763. He became an advocate, was drawn into the political vortex of the period, and after playing the part of a moderate liberal, withdrew into private life. In 1810 he became professor of philosophy in the University of France. At the restoration of 1814 he re-resigned his chair, but received various appointments from Louis XVIII., for whose return he had schemed as early as 1798. From 1815 till 1842 he was a member of the chamber of deputies, of which he was

president in 1828. He died in 1845. Royer-Collard introduced the philosophy of the Scottish or 'common-sense' school to France, and became the recognized head of the 'doctrinaire' school of which Jouffroy and to a certain extent Cousin were afterwards the chief representatives.

Royston-crow. See *Crow.*

Royton, town of Lancashire, England, 2 miles N.N.W. of Oldham. Pop. 13,395.

Rshev, a town of Russia, government of Tver, on the Volga, carrying on a large river traffic and hemp-spinning. Pop. 35,810.

Ruabon', a town of N. Wales, in Denbighshire, with extensive collieries and iron-works. Pop. (parish), 17,258.

Ruad. See *Aradus.*

Ruatan', or ROATAN', an island in the Bay of Honduras, chief of the Bay Islands (which see), is about 30 miles long and 10 miles broad. Pop. 2000–4000. The chief harbour is Port Royal.

Rubasse (rū-bas'), a lapidaries' name for a beautiful variety of rock-crystal, speckled in the interior with minute spangles of specular iron, reflecting a colour like that of the ruby. There is also a kind of artificial rubasse.

Rubber. See *India-rubber.*

Rubble Walls are walls constructed of irregular unhewn stones, either with or without mortar. In 'coursed rubble-work' the stones are roughly dressed and laid in horizontal courses; in uncoursed rubble the stones are built up together, large and small, being fitted to each other's forms with more or less exactness.

Rubefa'cients, in medicine, agents which, when applied externally as stimulants to the skin, occasion also a redness. The most commonly used rubefacients are ammonia, mustard, Cayenne pepper, oil of turpentine, powdered ginger, &c.

Ru'bellite, or red tourmaline, a siliceous mineral of a red colour of various shades, sometimes called siberite. It acquires opposite electricities by heat.

Ru'bens, PETER PAUL, the most eminent painter of the Flemish school, was born in 1577 at Siegen in Westphalia, though his childhood was spent chiefly at Cologne. After the death of his father in 1587, Rubens's mother returned with him to Antwerp, where he received a liberal education, laying the foundation for his later reputation as one of the most learned and accomplished men of his time. His bent towards painting early revealed itself, and under his first masters, Verhaegt, Adam Van Noort, and Otto Van Veen, he made rapid progress, and in 1598 was admitted as a master of the guild of painters in Antwerp. In 1600 he went to Italy, where he remained till 1608, chiefly at the court of the Duke of Mantua. On his return to the Netherlands his reputation was already great, and the Archduke Albert attached him to his court, with a salary of 500 livres. Rubens married his first wife, Isabella Brant, in 1609, and settled down in Antwerp to a successful and brilliant career, his studio crowded with pupils, to whose assistance, indeed, his detractors attributed the surprising number of pictures he turned out. In 1621 he was employed by Marie de' Medici to design for the gallery of the Luxembourg the well-known series of magnificent allegorical pictures illustrating the life of that princess. After the death of his wife in 1626 he was employed by the Archduchess Isabella in endeavouring to arrange a truce between Spain and the Netherlands; in 1628 he was engaged in the important private negotiations of a peace between Spain and England, in the course of which he visited Madrid and England (in 1629). He was knighted by Charles I., and his brush, never idle either in Madrid or London, decorated the ceiling of the banqueting-house at Whitehall. In 1630 he married Helena Fourment, who appears in many of his later works, and settled once more in Antwerp, where he continued to produce numerous pictures until his death in May 1640. Rubens was indisputably the most rapid of the great masters, and was remarkable for his fondness for large canvases. His great characteristics are freedom, animation, and a striking brilliancy and disposition of colour; while some critics reproach him with an unchastened exuberance of form, and an almost total absence of sublime and poetical conception of character. His works are in all branches of his art—history, landscape, portraiture, and genre—and are met with all over Europe. The Descent from the Cross in Antwerp Cathedral is generally considered his master-piece. His pictures number upwards of 2000, exclusive of about 500 drawings, a few etchings, &c.

Rube'ola. See *Measles.*

Rübezahl (rü'be-tsäl), Number Nip, the famous mountain-spirit of the Riesengebirge, in Germany, who is sometimes friendly and sometimes mischievous. He is the hero of numberless poems and legends.

Ru'bia, a genus of plants, type of the order Rubiaceæ, inhabiting Europe and Asia. Several species are employed in medicine and the arts. *R. tinctorum* is the madder plant, *R. cordifolia* is munjeet.

Rubia'ceæ, a large natural order of exogenous plants, under which many botanists include the orders Cinchonaceæ and Galiaceæ. It thus includes all monopetalous plants with opposite leaves, interpetiolar stipules, stamens inserted in the tube of the corolla and alternating with its lobes, and an inferior compound ovary. The typical genus is *Rubia* (which see).

Ru'bicon, a river in North Italy (now the Fiumicino, a tributary of the Adriatic), famous in Roman history, Cæsar having by crossing this stream (49 B.C.), at that time regarded as the northern boundary of Italy, finally committed himself to the civil war. Hence the phrase 'to pass the Rubicon' is to take the decisive step by which one commits one's self to a hazardous enterprise.

Rubid'ium, a rare metal discovered by Bunsen and Kirchhoff in 1860, by spectrum analysis; symbol Rb, atomic weight 85·4. It is a white, shining metal, and at ordinary temperatures it is soft as wax. It is usually found in connection with cæsium, and belongs to the group of the alkali metals. See *Cæsium*.

Ru'binstein, Anton Grigoryevitch, a Russian composer and pianist, born in 1829. In 1839 he made an extensive European tour, playing on the piano to enthusiastic audiences; and in 1842 he visited England. He then studied for eighteen months in Paris; studied and taught at Berlin and Vienna; and returned to Russia in 1848, where he devoted himself to farther study and to composing until 1856. On his reappearance in the concert-room his fame was at once assured by his phenomenal skill on the pianoforte, and his numerous tours which extended to America, formed a series of unbroken successes. In 1858 he established his headquarters at St. Petersburg, and assisted largely in the foundation of the Conservatoire in 1862, of which he was principal until 1867. In 1869 he was ennobled by the czar. As a composer he was very prolific, being especially happy in his pianoforte pieces. His operas have had but a qualified success. He died in 1894. He had previously published an autobiography.

Ruble. See *Rouble*.

Rubric, in the canon law, signifies a title or article in certain ancient law books, thus called because written in red letters (L. *ruber*, red). In modern use rubrics denote the rules and directions given at the beginning and in the course of the liturgy for the order and manner in which the several parts of the office are to be performed. Where red ink is not employed now the rubrics are printed in italics, or in some other distinctive character.

Rubruquis (rö'brụ-kwis), a distinguished traveller of the middle ages, otherwise Willem van Rubruk, a small town in Flanders, where he was born about 1215. He became a Franciscan missionary to the Holy Land, and in 1253 was despatched by Louis IX. of France on a semi-political, semi-proselytizing mission which took him into the heart of Asia, to the Great Khan of Tartary, then residing in the Gobi Desert. He brought back a mass of details as to the geography, ethnography, languages, manners, and religions of the countries he visited, that are now of the greatest interest and value. Rubruquis died sometime after 1293.

Rubus (rö'bus), a genus of plants, nat. order Rosaceæ. There are about a hundred species, among which are the British *R. Idæus*, or raspberry; *R. fruticōsus*, or common bramble; and *R. Chamæmōrus*, mountain-bramble or cloudberry.

Ruby, a precious stone of a deep-red colour, of which there are two varieties—the oriental and the spinel. The oriental ruby or true ruby is a corundum formed nearly exclusively of alumina, of great hardness, and the most valuable of all precious stones. A ruby of five carats, if perfect in colour, is said to be worth ten times as much as a diamond of the same weight. Oriental rubies are found chiefly in Burmah and Siam; inferior specimens have also occurred in North America and Australia. Spinel rubies consist of an aluminate of magnesium, and are much inferior to the true rubies in hardness and value. They are found in Burmah, Ceylon, and Australia. A lighter-coloured variety, discovered in Badakshan, is known as the balas ruby.

Ruby-tail (*Chrysis ignita*), a brilliantly coloured small insect, common in Great Britain, belonging to the sub-order Hymenoptera. They are sometimes called 'cuckoo-flies,' from their parasitic habit of depositing their eggs in the nests of bees and other hymenoptera.

Ruby-throat (*Trochilus colubris*), a species of humming-bird, so named from the

brilliant ruby-red colour of its chin and throat. In summer it is found in all parts of North America, up to 57° N. lat., being thus remarkable for its extensive distribution.

Rückert (rûk'ért), FRIEDRICH, a German poet, distinguished especially for his translations of oriental poetry, and his original poems composed in the same spirit, was born at Schweinfurt in Bavaria in 1788. After some years spent in teaching he became one of the editors of the Morgenblatt in Stuttgart in 1816–17. In 1826 he became professor of oriental languages at Erlangen, and in 1841 removed in the same capacity to Berlin. After his retirement in 1849 he lived on his estate near Coburg till his death in 1866. His poems are very numerous and he claims a place among the best lyrists of Germany. Die Weisheit des Brahmanen (6 vols. 1836–39) is among his most important Eastern works; the Geharnischte Sonnetten among the best known of his lyrical poems.

Rudd (*Leuciscus erythrophthalmus*), a

Rudd (*Leuciscus erythrophthalmus*).

fish of the carp family, having the back of an olive colour; the sides and belly yellow, marked with red; the ventral and anal fins and tail of a deep-red colour. It is common in Great Britain and throughout Europe. Its average length is from 9 to 15 inches. Called also *Red-eye*.

Rudder, that part of a helm or steering appliance which acts directly on the water. See *Steering*.

Rudder-fish (*Caranx Carangus*), a fish allied to the mackerel, very common in the Atlantic and Pacific Oceans, so named from its habit of swimming around the sterns of ships, attracted, doubtless, by the refuse thrown overboard. The flesh is said to be coarse in flavour.

Ruddiman, THOMAS, a celebrated Scottish scholar, was born in 1674 in Boyndie parish, Banffshire, where his father was a farmer. He graduated at Aberdeen University in 1694, and became schoolmaster at Laurencekirk. About 1700 he removed to Edinburgh, where he obtained the post of assistant in the Advocates' Library. Ruddiman supplemented his meagre salary of £8, 6*s*. 8*d*. by literary industry of a varied but generally erudite character. He also taught, and for some time was an auctioneer. Meanwhile he had won recognition as one of the leading scholars of the day; and the success of a printing business which he founded in 1715 enabled him to unite comfort with reputation till his death in 1758. From 1728 he was printer to the university; from 1729 he was proprietor of the Caledonian Mercury; and from 1730 till 1752 he was keeper of the Advocates' Library. His best-known work is his famous Rudiments of the Latin Tongue (1714), a book which immediately superseded all previous treatises of a similar kind, and long remained in use in the schools of Scotland. In 1715 he edited the first collected edition of George Buchanan's works, with severe strictures dictated by his own Jacobite leanings.

Rudesheimer. See *Rhenish Wines*.

Ru'dolph. See *Rodolph*.

Ru'dolstadt, a town in Germany, capital of the Thuringian principality of Schwarzburg-Rudolstadt, on the Saale, 20 miles S. of Weimar. It manufactures cloth, porcelain, and chemicals. The prince resides in the Heidecksburg, on an eminence overlooking the town. Pop. 10,562.

Rue, a strong-scented herbaceous plant of the genus *Ruta*, nat. order Rutaceæ, a native

Rue (*Ruta graveŏlens*).

of S. Europe, but also cultivated in gardens in Great Britain, &c. The root is perennial,

woody; the stems about 2 feet high; the leaves alternate, petiolate, and divided; and the flowers yellow. The odour of rue is strong and penetrating, and the taste acrid and bitter. It has useful medicinal properties. This plant is an ancient emblem of remembrance from its evergreen quality. The old names 'herb-grace' or 'herb of grace' refers to this fact, or perhaps to its common use in sprinkling the people with holy water, and as a charm against witchcraft. About 20 species of rue are known.—Oil of rue is obtained by distilling garden rue (*Ruta graveŏlens*) with water; has a strong, disagreeable odour and slightly bitter taste; and is used as an ingredient in aromatic vinegar.

Ruff (*Machētes pugnax*), a bird belonging to the grallatores or waders, length, 10½ to 12½ inches; plumage, which varies greatly in colour, generally variegated brown

Ruff (*Machētes pugnax*).

on back and wings, white on belly. In the breeding season the male has its neck surrounded by long plumes, which when raised form a kind of tippet or ruff, whence its English name. The scientific name ('pugnacious fighter') is derived from its pugnacious habits at the same season. The females are called *reeves*. These birds nest in swamps; the eggs, three or four in number, are pale green blotched with brown. The ruffs are birds of passage, and were formerly abundant in Great Britain.

Ruffe (*Acerina vulgāris* or *cernua*), a European fresh-water fish of the perch family. Though rarely more than 6 or 7 inches in length it is much esteemed for the table. It is sometimes called the *pope*, though the origin of this name is unknown.

Ruffed Grouse (*Bonāsa umbellus*), a N. American species of grouse of the same genus as the hazel-grouse of Europe. It is named from the tufts of feathers on the sides of its neck, and frequents forests and thickets.

Rufi'ji, or **Lufiji**, a river of Eastern Africa which rises to the north-east of Lake Nyassa, and enters the Indian Ocean opposite the island of Mafia.

Rugby, a town in Warwickshire, England, on the Avon, 15 miles N.E. of Warwick, is an important railway junction and the seat of a famous boys' school, one of the great 'public schools,' founded in 1567, of which Dr. Arnold became head-master in 1828, and had as successors Tait, afterwards archbishop of Canterbury, and Temple, bishop of London. The number of pupils is about 550. The town has some handsome churches, a town-hall, and a number of charities. Pop. 11,262.

Rugeley (rŏj'li), a town in Staffordshire, England, on the Trent, 7 miles north-west of Lichfield, has iron-foundries and extensive collieries. Pop. 4181.

Rügen (rü'gen), an island in the Baltic belonging to Prussia, near the coast of Pomerania; area, 377 sq. miles; exceedingly irregular in shape. The surface is fertile, undulating, and in many places covered with beautiful beech forests. The Stubbenkammer, a sheer chalk cliff (400 feet high) at the north-east extremity, is frequently visited. The capital is Bergen. Many of the coast villages are popular sea-bathing resorts. From 1648 till 1815 Rügen belonged to Sweden. Pop. 45,039.

Rugendas (rö'gen-dàs), Georg Philipp, German battle-painter, was born at Augsburg in 1666. He often exposed himself to great danger studying his subjects on the field. His paintings and engravings are very numerous; among the latter are six representing the siege of Augsburg, at which he was present. His compositions are spirited and unstrained; he also executed engravings in mezzotint and etchings. He died at Augsburg in 1742. His three sons are also known as engravers; and his great-great-grandson, Johann Moritz Rugendas (1802–58), as a genre and landscape painter.

Ruhmkorff's Coil. See *Induction Coil.*

Ruhnken (rön'ken), David, German classical scholar, born 1723, died 1798. The son of rich parents, he was able to devote his life to the study of the classics, especially of the Greek authors, spending most of his time after 1743 at Leyden. In 1757 he became assistant professor of Greek, and in 1761

professor of history and rhetoric at Leyden University. Ruhnken published valuable and erudite editions of Timæus's Lexicon Vocum Platonicarum (1754), Velleius Paterculus (1779), and other learned works.

Ruhr (rör), a river of Prussia, joins the Rhine at Ruhrort, about 19 miles north of Düsseldorf. It rises in Westphalia, and has a tortuous course of about 200 miles, latterly through the busy and prosperous Ruhr Coalfield.

Ruhrort (rör'ort), a town of Prussia, in the government of Düsseldorf, at the confluence of the Ruhr with the Rhine, has a large harbour, and is one of the chief centres for the coal and other trade of the important industrial district of Westphalia. Pop. 9866.

Rule, Britannia, a British national song, of which the words, almost certainly by James Thomson, form part of the masque of Alfred, by Thomson and David Mallet, which was first performed in 1740. The music was written by Dr. Arne.

Rule Nisi, or RULE TO SHOW CAUSE, in English and American law, an order granted by the court on an interlocutory application (formerly always *ex parte*), directing the party opposed to the applicant to do or abstain from some act, unless (*nisi*) he can *show cause* why the order should not be obeyed. If cause is shown the order is 'discharged,' otherwise it is made 'absolute,' and the party ruled must obey on pain of attachment for contempt.

Rule of the Road. See *Road*. As to the rule of the road at sea, see *Collisions*.

Rule of Three, THE, an application of the doctrine of proportion to arithmetical purposes by which we are enabled to find a fourth proportional to three given numbers, that is, a number to which the third bears the same ratio as the first does to the second. The rule is divided into two cases, *simple* and *compound;* now frequently termed *simple* and *compound proportion. Simple proportion* is the equality of the ratio of two quantities to that of two other quantities. *Compound proportion* is the equality of the ratio of two quantities to another ratio, the antecedent and consequent of which are respectively the products of the antecedents and consequents of two or more ratios.

Rum, the liquor obtained by distillation from the skimmings and the molasses formed in the manufacture of cane-sugar. The pure distilled spirit is colourless, and receives its brown tint from the addition of caramel. Rum is obtained chiefly from the West Indies and British Guiana; the best sort is named Jamaica rum, no matter where manufactured. Pine-apple rum is ordinary rum flavoured with sliced pine-apples; tafia is an inferior French variety of rum.

Rum, a rocky and hilly island of the Inner Hebrides in Argyleshire, Scotland, south of Skye, greatest elevation 2553 feet, is about 20 miles in circumference. Only about one-twentieth of the surface is under cultivation, the rest is surrendered to sheep and deer. Pop. 53.

Rumania. See *Roumania.*

Rume'lia, or RU'MILI (land of the Romans), a former political division of Turkey in Europe, comprising ancient Thrace and part of Macedonia, and including Constantinople and Salonica.

Rumelia. See *Eastern Roumelia.*

Rumen, the upper or first stomach of ruminants (which see).

Rumex, a genus of plants belonging to the nat. order Polygonaceæ, occurring chiefly in the temperate zones of both hemispheres, the species of which are known by the name of *docks* and *sorrels.* Many are troublesome weeds. Some have been used as a substitute for rhubarb-root, and others are cultivated for their pleasant acid foliage.

Rumford, SIR BENJAMIN THOMSON, COUNT, natural philosopher and philanthropist, was born in Woburn, Massachusetts, in 1753. He was apprenticed for a time in a store at Salem, then studied medicine, and finally became a school teacher, until his marriage in 1772 with a rich widow laid the foundation of his fortune. He espoused the British side in the American war, and became a major; and on going to England in 1776 received a government post. In 1784 he was knighted and received permission to enter the service of the Elector of Bavaria. As a minister of war and afterwards of police he reorganized the Bavarian army, suppressed mendicity, and carried through other important social reforms. He was made count of the Holy Roman Empire in 1791, and took his title from Rumford (now Concord) in New Hampshire, his wife's home. From 1797 till 1804 he lived chiefly in England; but he afterwards settled in France, where he married the widow of Lavoisier, the chemist, from whom he soon separated. He died at Auteuil in 1814. Rumford was interested in science from an early period of his life, and distinguished himself by his researches and discoveries as to the nature and application of heat. He

discovered the principle on which modern chimneys and fireplaces are now made, and he, in conjunction with Sir Joseph Banks, projected the Royal Institution.

Ruminants, or RUMINANTIA, a group of herbivorous mammals, belonging to the great order of Hoofed or Ungulate Mammals, included in the Artiodactyle or 'even-toed' section of these, and comprising the five families Camelidæ (camel and llama), Tragulidæ (chevrotain), Cervidæ (true deer), Camelopardalidæ (giraffe), and Bovidæ or Cavicornia (ox, sheep, goat, antelope). The faculty of rumination, though it gives name to this order, is not quite peculiar to it. (See *Rumination.*) Ruminants are distinguished from other orders by certain peculiarities of dentition. The most typical of the group, the ox, sheep, antelope, &c., have no incisor or canine teeth in the upper jaw, but have instead a hardened or callous pad against which the six lower incisors bite. In the lower jaw are two canines quite similar to the incisors, and the Camelidæ and Tragulidæ possess also upper canines. In both jaws are six grinding teeth on either side, separated by an interval from the front teeth. The feet of ruminants are cloven. Horns, developed in pairs, are present in the majority of the species; either solid, as in the antlers of the true deer, or hollow as in the horns of the ox, &c. The alimentary canal is very long. The stomach is divided into four compartments, frequently spoken of as four stomachs. The first and largest (*rumen* or *paunch*) receives the food roughly bruised by the first mastication, and transmits it to the second (*reticulum* or *honey-comb*), whence it is sent back in pellets to the mouth to be rechewed. This second mastication is called 'chewing the cud.' The food is then reswallowed into the third stomach (*psalterium, omasum,* or *manyplies*), and passes finally into the true digestive cavity (*abomasum*). Fluids may pass directly into any part of the stomach. In young ruminants, which feed upon milk, the first three 'stomachs' remain undeveloped until the animal begins to take vegetable food. Most of the ruminants are suitable for human food. They are generally gregarious, and are represented by indigenous species in all parts of the world except Australia.

Rumination, the faculty possessed by some mammals, notably ruminants (which see), of 'chewing the cud'—that is, of returning the food to the mouth from the stomach for remastication prior to final digestion. Some marsupials and certain other mammals probably share this faculty with the ruminants.

Rump Parliament is the name by which the fag-end or remainder of the Long Parliament (1640–60) was known after the expulsion of the majority of its members on Dec. 6, 1648, by Cromwell's soldiers, commanded by Colonel Pride. Only sixty members, all extreme Independents, were admitted after this Pride's Purge, as it was called; and they, with the army, brought about the condemnation of Charles I. The *Rump* was forcibly dissolved by Cromwell in 1653, for opposing the demands of the army. Twice after this it was reinstated, but both times only for a brief period, and finally, on the 16th March, 1660, it decreed its own dissolution.

Rum Shrub, a liqueur prepared with rum, orange, and lemon juice and sugar.

Runciman, ALEXANDER, historical painter, was born at Edinburgh in 1736. He studied in Glasgow, and in 1766 went to Rome, where he formed an acquaintance with Fuseli. Hitherto he had devoted himself to landscape without much success; but about this time he turned his attention to historical painting, in which he enjoyed some reputation at Edinburgh, where he settled in 1772. His chief work was a series of frescoes from Ossian's poems, executed for Sir J. Clerk of Penicuik. He died in 1785.—His brother JOHN (1744–66) was also a painter of considerable promise.

Run'cinate, in botany, pinnatifid, with the lobes convex before and straight behind, pointing backwards, like the teeth of a double saw, as in the dandelion.

Run'corn, an English river-port, in Cheshire, on the Mersey, 12 miles above Liverpool, has ship-building yards and various factories. It lies on the Manchester Canal at the terminus of the Bridgewater Canal, from the completion of which in 1773 its prosperity dates. Pop. 20,050.

Ru'neberg, JOHAN LUDWIG, Swedish poet, born at Jakobstad, Finland, 1804; died at Borgå, Finland, 1877. In 1837 he became professor of Latin at Borgå College, where the rest of his life was spent. His works, which hold a high rank in the literature of Sweden, include the Grave in Perrho, a poetic romance; the Elk Hunters, an epic; Hanna, an idyllic poem; Nadeshda, a Russian romance; Kung Fjalar, a series of romances; Ensign Stål's stories; several volumes of lyrics, comedies, and prose essays.

Runes, the letters of the alphabets peculiar to the ancient Teutonic peoples of North-western Europe, found inscribed on monuments, tomb-stones, clog-calendars, bracteates, rings, weapons, &c., and only rarely and at a late period in MSS. They are formed almost invariably of straight lines,

Norse Runic Alphabet.

either single or in combination. Three runic alphabets (or 'futhorks,' as they are sometimes called from the first six letters) have hitherto been usually recognized; the Norse, with sixteen characters, the Anglo-Saxon, with forty, and the German; but modern researches have traced the common origin of these in an older primary Germanic or Teutonic futhork with twenty-four characters. The name is generally believed to be the same as A. Saxon *rûn*, a mystery, implying a magical or hieroglyphic character, which doubtless runic writings acquired when the lapse of time had rendered them unintelligible to the common people; and runic wands or staves were smooth willow-wands inscribed with runic characters, and used in incantations. The period of origin and the source of runes are not known. Scandinavian and A. Saxon tradition ascribes their invention to Woden. Some have believed that the Scandinavians learned the art of writing from Phœnician merchants trading to the Baltic; Dr. Isaac Taylor recognizes in the Greek alphabet the prototype of the futhorks; while others find it in the Latin. Runic inscriptions abound in Scandinavia, Denmark, Iceland, and the parts of England once known as Northumbria, Mercia, and East Anglia, but they are also found beyond these limits. Weapons and instruments, inscribed with runes, and dating from 300–400 A.D., have been dug up in Norway. The use of runes gradually disappeared under the influence of the early Christian missionaries, who proscribed them on account of their magical reputation; but in England some Christian inscriptions have been found in the runic characters. The latest runic inscriptions in Sweden date about 1450.

Runjeet Singh, the 'Lion of the Punjab' and founder of the Sikh kingdom, was born in 1780, and died 1839. His father, a Sikh chieftain, died in 1792, and the government fell into the hands of his mother. At the age of seventeen, however, Runjeet rebelled against his mother's authority, assumed the reins himself, and began a career of ambition. The Shah of Afghanistan granted him possession of Lahore, which had been taken from the Sikhs, and Runjeet soon subdued the small Sikh states to the north of the Sutlej. The chiefs to the south of that river invoked the protection of the British, who made an arrangement with Runjeet in 1809, both accepting the Sutlej as the south boundary of his dominions. The ambitious prince now organized his army after the European model with the help of French and English officers, and steadily extended his power, assuming the title of rajah in 1812. In 1813 he took Attock, and in the same year assisted Shah Shuja, then a refugee from Afghanistan, in return for the famous Koh-i-noor diamond. In 1818 he captured Mûltan; in 1819 he annexed Cashmere, and in 1823 the Peshawur Valley. He was now ruler of the entire Punjab, and in 1819 had already assumed the title of Maharajah, or king of kings. In 1836 he suffered a heavy defeat from the Afghans, but he retained his power until his death. See *Punjab*.

Run'nimede, the meadow on the right bank of the Thames, now a race-course, in Surrey, England, 4 miles below Windsor, where King John met the barons who compelled him to sign Magna Charta, June 15, 1215. The actual signing is said to have taken place on Magna Charta Island opposite Runnimede.

Rupar, a manufacturing and trading town of Hindustan, in Umballa district, Punjab, is situated on the Sutlej, 43 miles N. of Umballa. Pop. 10,326.

Rupee', the standard silver coin of British India, the sterling value of which, nominally 2*s.*, has, owing to the depreciation of silver, of late years varied between about 1*s.* 5*d.* and 1*s.* 1*d.* A rupee equals 16 annas; ½, ¼, and ⅛ rupee are also coined in silver. 100,000 rupees are called a lac; 100 lacs, a crore.

Rupert of Bavaria, PRINCE, distinguished as a cavalry leader in the English civil war, the third son of Frederick V., elector palatine and king of Bohemia, by Elizabeth, daughter of James I. of England, was born in 1619 at Prague. After some military experience on the Continent he went to England to assist his uncle Charles I., and

in 1642 was made general of the horse. He distinguished himself at Edgehill and Chalgrove, captured Birmingham and Lichfield in 1642, and Bristol in 1643, and displayed his courage at Marston Moor and Naseby in 1645, though his impetuosity and imprudence contributed to the disastrous results of these engagements. His feeble defence of Bristol against Fairfax involved him in temporary disgrace with Charles; but in 1648 he was made admiral of the English royalist fleet. He carried on a predatory naval war against the parliament in European waters, until Blake forced him to escape to the West Indies, where he preyed upon English and Spanish merchantmen somewhat after the manner of a bucaneer. In 1653 he joined Charles II. at Versailles. After the Restoration he was appointed lord-high-admiral, and served with Monk against the Dutch. He became governor of Windsor Castle, and died in London in 1682. Many of his latter years were devoted to scientific study, and he is credited with the invention of mezzotint engraving, which at least he introduced into England. (See also *Prince Rupert's Drops.*) He was one of the founders and the first governor of the Hudson's Bay Company. See *Rupertsland.*

Rupertsland, an extensive but indeterminate region in the interior of Canada, named in honour of Prince Rupert, and transferred to the Hudson's Bay Company, of which that prince was one of the founders, by Charles II. in 1670. This region is now included in Manitoba and the Western Territories, but its name still gives the title to the Bishop of Rupertsland, who resides at Winnipeg.

Ru'pia, a skin disease, consisting of an eruption of small flattened and distinct *bullæ* surrounded by inflamed areolæ, containing a serous, purulent, sanious, or dark bloody fluid, and followed by thick, dark-coloured scabs over unhealthy ulcers. It is a chronic disease; and though not dangerous, is often very obstinate and tedious. It is not contagious.

Ruppin, NEU, a manufacturing town in Prussia, province of Brandenburg, on a lake of the same name. Pop. 14,587.

Rupture. See *Hernia.*

Rural Deans, officials in the English Church, dating from before the Reformation, were parish priests intrusted by the bishops with the duty of inspecting and reporting upon the conduct of clergy and people in groups of parishes. This office is being revived by some bishops from almost complete desuetude; but the name of rural deaneries, as ecclesiastical districts, has always been in use.

Rurik, the founder of the Russian monarchy, who flourished in the 9th century, is generally considered to have been a Varangian or Scandinavian, and to have led a successful invasion against the Slavs of Novgorod about 862. He was assisted by his brothers, to whose territories he afterwards succeeded. He died in 879, and his family reigned in Russia till the death in 1598 of Feodor, son of Ivan the Terrible, when it was succeeded by the house of Romanoff. Many Russian families still claim a direct descent from Rurik.

Rurki, or ROORKEE, a manufacturing town in Saháranpur district, North-west Provinces, Hindustan, on the Solání, is the seat of the Ganges Canal workshops and iron-foundry, and the Thomason Civil Engineering College. Pop. 17,376.

Rusa, a genus of Cervidæ, containing several species of deer, natives of the forests of India and the Eastern Archipelago. They may be described as large stags with round antlers, having an anterior basal snag, and the top forked, but the antlers not otherwise branched. The great rusa (*R. hippelaphus*) is a native of Java, Sumatra, &c.; it has brown, rough hair, the neck in the male being covered with a mane. The sambur (*R. Aristotelis*) also belongs to this genus. It is a large and powerful animal inhabiting the forests and mountains of N. India, generally morose and savage in disposition.

Ruscus, a small genus of plants, natural order Liliaceæ. See *Butcher's-broom.*

Rush, the common term for some of the different species of *Juncus,* a genus of plants, natural order Juncaceæ. The rushes have a glumaceous perianth of six sepals, glabrous filaments, three stigmas, and a three-celled many-seeded capsule. The leaves are rigid, mostly roundish, and smooth. Rushes are found chiefly in moist boggy situations in the colder climates; about twenty species are noted in the British flora. The leaves are often employed to form matting and the bottoms of chairs, and the pith for the wicks of candles. The name is also given to plants of various other genera besides *Juncus,* and by no means to all species of *Juncus.*

Rush, BENJAMIN, famous American physician, was born in 1745 near Philadelphia. In 1766 he went to Edinburgh, and took his degree of M.D. there in 1768. He began

to practise at Philadelphia in 1769, becoming at the same time lecturer in chemistry at the medical school of that city. He afterwards filled the chair of the theory and practice of physic in the University of Pennsylvania. He early identified himself with the patriotic party, was one of the signers of the Declaration of Independence, and in 1787 was a member of the convention of Pennsylvania for the adoption of the federal constitution. In 1774 he was one of the founders of the first antislavery society in America. He died in 1813. Dr. Rush was a voluminous and versatile writer. His chief medical works are his Medical Inquiries and Observations, Diseases of the Mind, and Medical Tracts.

Ruskin, JOHN, art critic and political economist, and one of the most eloquent English prose writers of the century, was born at London in Feb. 1819. He studied at Christ Church, Oxford; gained the Newdigate prize for his poem on Salsette and Elephanta in 1839, and graduated in 1842. His subsequent life has been the busy but uneventful life of a writer and teacher. In 1867 he was appointed Rede lecturer at Cambridge, and in 1870–72, 1876–78, 1883–85 he was Slade professor of fine art at Oxford, where in 1871 he gave £5000 for the endowment of a university teacher of drawing. Since 1885 Mr. Ruskin has lived in seclusion at his residence of Brantwood, on Coniston Lake. He is an LL.D. of Cambridge (1867), and a D.C.L. of Oxford (1871). In 1843 appeared the first volume of Modern Painters, by a Graduate of Oxford, in which Ruskin maintained the superiority of modern landscape-painters, especially Turner, to the older masters, and at the same time advocated a complete revolution in the received conventions of art and art criticism. The subsequent volumes, of which the fifth and last appeared in 1860, expanded the subject into a most comprehensive treatise on the principles which underlie, or should underlie, art, while similar criticism was extended to another domain of art in his Seven Lamps of Architecture (1851), and his Stones of Venice (1851–53). In 1851 Ruskin appeared as a defender of pre-Raphaelitism, which had found inspiration in his works. As a political economist and social reformer he is an outspoken and uncompromising foe of what he considers the selfish and deadening doctrines of the so-called Manchester school, his chief works in this sphere being Unto this Last (1862), Munera Pulveris (1872), and Fors Clavigera (1871–84), a periodical series of letters to the working-men and labourers of Great Britain. The Guild of St. George, a kind of cultured socialistic society, founded by him in 1871, with its headquarters at Sheffield, may also be taken to represent his views. Mr. Ruskin's other chief works,

John Ruskin.

apart from pamphlets and contributions to periodicals, are: Poems (1850); King of the Golden River (1851), a fairy legend; Notes on the Construction of Sheepfolds (1851), a contribution to ecclesiastical controversy; Giotto and his Works at Padua (1854); Lectures on Architecture and Painting (1854); Notes on the Royal Academy (1855–59 and 1875); the letterpress accompanying Turner's Harbours of England (1856); Notes on the Turner Gallery at Marlborough House (1857); Catalogue of Turner's Sketches at the National Gallery (1857); Elements of Drawing (1857), partly reproduced in Laws of Fésole (1877–78); Political Economy of Art (1857), better known as A Joy for Ever, the title of the edition of 1880; Elements of Perspective (1859); Sesame and Lilies (1865); Study of Architecture in our Schools (1865); Ethics of the Dust (1866); Crown of Wild Olive (1866); Letters to a Corkcutter of Sunderland (1867); Time and Tide, by Weare and Tyne (1867); Queen of the Air (1869); Lectures on Art (1870); Aratra Pentelici (1872); The Eagle's Nest (1872); Ariadne Florentina (1873); Love's Meinie (1873); Val d'Arno (1874); Proserpina (1875); Deucalion (1875); Mornings in Florence (1875); Frondes Agrestes (1875–76), 'read-

ings' from Modern Painters; St. Mark's Rest (1877); Elements of English Prosody (1880); Arrows of the Chace (1880), a collection of his letters by one of his pupils; Fiction, Fair and Foul, in the 19th Century (1880–81); Our Fathers have Told Us (1881); Lectures on the Art of England (1883); On the Pleasures of England (1884); Sir Herbert Edwards (1885); and Hortus Inclusus (1887), a selection of letters. From 1885 onwards, Mr. Ruskin issued a series of autobiographical papers under the title Praeterita. Several of these works are illustrated by the author, and 'first editions' with good impressions of the plates now command very high prices. Eloquence, force, and subtle analysis are the prevailing characteristics of Ruskin's literary style, while his works are at the same time permeated with a lofty enthusiasm for truth and beauty, and with a generous sympathy for the poor and the weak. Sometimes, however, he is betrayed into exaggeration, and not unfrequently his propositions are needlessly violent and paradoxical, occasionally even contradictory. Met at the outset with keen and even bitter criticism, he has nevertheless given the impulse to a not unimportant renaissance in British art, though the new birth is, in many respects, very different from the ideal he held up. Scarcely less may be said of his work in political and social economy.

Russell, HOUSE OF, an ancient English family, the head of which is the Duke of Bedford, has long been conspicuous in English political history for its devotion to liberal or whig principles. It claims descent from Turstain, one of the Norse invaders of Normandy, who took possession of Rozel Castle, near Caen. His descendants, Hugh de Rozel and his brother, accompanied William the Conqueror to England, where their name assumed its present form about 1200.—JOHN RUSSELL was constable of Corfe Castle in 1221.—Sir JOHN RUSSELL was speaker of the House of Commons under Henry VI., and his grandson was created Earl of Bedford in 1550.—WILLIAM RUSSELL, the 5th earl and father of Lord William Russell (see below), was created Marquis of Tavistock and Duke of Bedford in 1694.—JOHN, 4th duke (1710–71), held office in the Newcastle and Grenville ministries, and was lord-lieutenant of Ireland in 1756–62.—FRANCIS, 5th duke (1765–1802), was distinguished for his services to agriculture.—FRANCIS, 7th duke (1788–1861), eldest brother of John, Earl Russell (see below), was summoned to the House of Lords in 1832 before the death of his father in 1839, but held no office. The present (11th) duke is ARTHUR, born in 1858.—Admiral Edward Russell, who defeated the French at the battle of La Hogue in 1692, was also a scion of this house.

Russell, JOHN, EARL RUSSELL, English Liberal statesman, was the third son of the sixth duke of Bedford, was born in London in 1792, and died at Richmond in May 1878. Educated at a private school and at

John, Earl Russell.

Edinburgh University, he entered parliament in 1813 before attaining his majority. In 1819 he made his first motion in favour of parliamentary reform, the great question of which through life he was the champion. His influence in the Liberal party steadily increased, and though temporarily unseated in 1826, owing to his advocacy of Catholic Emancipation, he carried a motion in 1828 against the Test Acts and thus led to their repeal. In 1831 he was paymaster-general in Lord Grey's administration, and though not in the cabinet introduced the first Reform Bill to the House of Commons. In the exciting struggle that followed Lord John Russell was popularly accepted as the great champion of reform. In Lord Melbourne's second cabinet (1835–41) Russell was home secretary, and in 1839 he became colonial secretary. From 1841 till 1845 he led the opposition against Peel, with whom, however, he was in sympathy on the Corn Law question; and when Peel resigned in

1846 Russell formed a ministry and retained power, though with a small and uncertain majority, until February 1852. He re-entered office in December 1852 as foreign secretary under Lord Aberdeen, and in 1855 became colonial secretary in Lord Palmerston's cabinet. He represented Great Britain at the Vienna conference, but incurred by his negotiations so much unpopularity that he resigned office in July of the same year. A period of rivalry between Lord John Russell and Palmerston now ensued, which, however, ended in 1859, when the former became foreign secretary under his old chief, by whom he was raised to the peerage in 1861. In 1865 Earl Russell succeeded Lord Palmerston in the leadership of the Liberal party, but when his new reform bill was rejected in 1866 the Liberals resigned. Thenceforward Earl Russell held no farther office, though he warmly advocated all liberal measures. He was the author of numerous books and pamphlets, including lives of Thomas Moore, Lord William Russell, and Charles Fox, and Recollections and Suggestions (1813–73), published in 1875.

Russell, JOHN SCOTT, engineer and naval architect, was born near Glasgow in 1808. After graduating at Glasgow at the age of sixteen he became a science-lecturer in Edinburgh, and in 1832–33 temporarily filled the chair of natural philosophy at Edinburgh University. Next year he began his important researches into the nature of waves, which led to his discovery of the wave of translation, on which he founded the wave-line system of naval construction introduced into practice in 1835. He was manager of a large ship-building yard on the Clyde for several years, and in 1844 established a yard of his own on the Thames. He was one of the earliest advocates of iron-clad men-of-war, and was joint-designer of the *Warrior*, the first English sea-going armoured frigate; but the most important vessel he designed and constructed was the *Great Eastern*. One of his chief engineering works was the vast dome of the Vienna Exhibition of 1873, which had a clear span of 360 feet. He died at Ventnor in 1882. He was the author of The Modern System of Naval Architecture (London, 1864–65; 3 vols. folio), and other writings.

Russell, LORD WILLIAM, an English statesman and political martyr, was the third son of the fifth Earl Russell, and was born in 1639. He entered parliament immediately after the Restoration, and in 1669 married Rachel, second daughter of the Earl of Southampton and widow of Lord Vaughan. He now began to take a prominent part in politics as a leader of the Whigs, animated by a bitter distrust of the Roman Catholics and a strong love of political liberty. For a brief period in 1679 he was a member of the new privy-council appointed by Charles II. to ingratiate himself with the Whigs. Resigning, however, in 1680, he rendered himself conspicuous in the efforts to exclude the king's brother, the Roman Catholic Duke of York, from the succession to the throne, but retired from public life when the Exclusion Bill was rejected. When the Ryehouse Plot was discovered in 1683 Russell was arrested on a charge of high-treason, and though nothing was proved against him the law was shamefully stretched to secure his conviction. He was sentenced to death, and no efforts of his friends availed to save him. Russell met his fate with dignity and firmness. He was beheaded in Lincoln's Inn Fields, London, in July 1683. An act was passed in 1689 (1 William and Mary) reversing his attainder.

Russell, WILLIAM CLARK, novelist, born of English parents at New York 1844, his father being Henry Russell, the popular singer and composer. He went to sea at an early age, but abandoned his nautical career in 1865 and took to literature. He has been connected with the newspaper press, but earned fame as the writer of sea stories. Among his most popular books are John Holdsworth Chief Mate, The Wreck of the Grosvenor, A Sea Queen, The Lady Maud, Jack's Courtship, Marooned, An Ocean Tragedy, &c.

Russell, WILLIAM HOWARD, LL.D., war correspondent, was born near Dublin 1821, educated at Trinity College, Dublin; called to the English bar in 1850. His connection with the Times began in 1843; he was war correspondent during the Danish war of 1848, but it was his letters written from the Crimea in 1854–55 that first made him famous. He was present at Alma, Balaclava, Inkerman, and the assaults on Sebastopol, and his letters were the chief means of making public the condition of the army. He was similarly engaged during the Indian Mutiny, the American Secession war, the Prusso-Austrian war, and the Franco-German war. He accompanied the Prince of Wales to India in 1875. His publications comprise The British Expedition to the Crimea, Diary in India, My Diary North

and South, My Diary in the Last Great War, Prince of Wales' Tour, Doctor Brady, a novel, and Hesperothen, travels in America.

Russia, one of the most powerful empires of the world, second only in extent to the British Empire, which has about 11,000,000 sq. miles, and third as regards population, the Chinese Empire ranking first with about 400 million inhabitants, the British Empire second with some 380 millions. It comprehends most of Eastern Europe and all Northern Asia, and is bounded N. by the Arctic Ocean; W. by Sweden, the Gulf of Bothnia and the Baltic, Prussia, Austria, and Roumania; S. by the Black Sea, Turkey in Asia, Persia, Afghanistan, the Chinese Empire; E. by the Pacific and Behring's Strait. The total area in 1896 was officially estimated at 8,644,100 sq. miles; while the population for the year 1893 was as follows:—

Russia in Europe (including Poland),	99,936,560
Finland,	2,431,953
Caucasian Provinces,	7,864,223
Siberia,	4,856,902
Central Asia,	6,316,190
	121,405,828

For administrative purposes Russia is now divided as follows:—

European Russia, including Sea of Azof, the Vistula Provinces (former Poland), and Finland; area, 2,095,504 square miles; pop. 102,368,513. Russia Proper is subdivided into fifty provinces: Archangel, Astrakhan, Bessarabia, Courland, Don Cossacks, Ekaterinoslaf, Esthonia, Grodno, Kaluga, Kazan, Kharkoff, Kherson, Kieff, Kostroma, Kovno, Kursk, Livonia, Minsk, Mohilev, Moscow, Nijni-Novgorod, Novgorod, Olonetz, Orel, Orenburg, Penza, Perm, Podolia, Poltava, Pskof, Riazan, St. Petersburg, Samara, Saratoff, Simbirsk, Smolensk, Tambof, Taurida, Tchernigoff, Tula, Tver, Ufa, Vilna, Vitebsk, Viatka, Vladimir, Volhynia, Vologda, Voronezh, Yaroslavl. Poland forms ten provinces: Kalisz, Kielce, Lomza, Lublin, Piotrkov, Plock, Radom, Siedlce, Suwalki, and Warsaw. Finland, eight provinces: Abo-Björneborg, Kuopio, Nyland, St. Michel, Tavastehus, Uleåborg, Vasa, and Viborg. There are also certain popular divisions of Russia, as Great Russia (in the centre), Little Russia (in the south-west), White Russia (in the north-west). *Asiatic Russia* is divided into: Northern Caucasia, Transcaucasia, Transcaspia, Kirghiz Steppes, Turkestan, Western Siberia, Eastern Siberia, Amur and Maritime Provinces. St. Petersburg and Moscow are the two capitals of the empire.

General Description.—European Russia consists almost wholly of immense plains, the Valdai Hills, between St. Petersburg and Moscow, averaging 500 feet and never exceeding 1200 feet above sea-level, forming the only elevated region of the interior and an important watershed. The mountains of Taurida, lining the southern shores of the Crimea, have a height of about 4000 feet; the Caucasus, running from the Black Sea to the Caspian, reach the height of 18,500 feet; the Urals, stretching from the Caspian to the Arctic Ocean and separating European from Asiatic Russia, have their greatest height below 7000 feet. Beyond the Urals are the vast Siberian plains slightly inclining to the N., and becoming mountainous in some parts towards the S. and E. Part of the Thian-Shan Mountains and of the Altai Mountains, on the boundary between the Russian and Chinese Empires, belong to Siberia. (See *Siberia*.) Russia is watered by numerous and important rivers, some of great magnitude and running a course of thousands of miles. The Petchora, the Mezene, Northern Dwina, and Onega are the principal rivers of European Russia which send their waters to the Arctic Ocean; the Neva, Volkhoff, Soir, Narova, Velikaya, Duna, Niemen, and Vistula belong to the Baltic basin; the Black Sea basin comprises the Pruth, Dniester, Dnieper, and the Don; whilst the Caspian receives besides other rivers the Volga, the largest of all Russian rivers. Asiatic Russia has also a number of very large rivers, as the Obi, Yenisei, and Lena in Siberia, and the Amur towards the Chinese frontier. This complete river system is of incalculable value to Russia, as by its means internal communication is carried on. Canals connect the navigable rivers, so as to form continuous water-ways. River steam navigation has been much developed of recent years. The lakes are also on a gigantic scale. Lake Ladoga, near St. Petersburg, is the largest in Europe. Other large lakes in Europe are those of Onega, Peipus, and Ilmen. In Asia there is the Sea of Aral; larger than any of those mentioned, followed by Baikal, Balkash, and others. The Caspian Sea now also forms almost a Russian lake. From the extent of the plains and steppes, the swamps, moors, desert wastes, and forests of Russia, the scenery as a whole is very monotonous.

Climate and Soil.—As may be expected

from its vastness this empire offers soils and climates of almost every variety. There is a polar, a cold, a temperate, and a warm region; in the first vegetation is all but extinct, in the last the vine, the olive, and even the sugar-cane grow to perfection. Extreme cold in winter and extreme heat in summer are, however, a general characteristic of Russian climates. In the cold region the thermometer varies from 80° in summer to 30° below zero in winter. The temperate zone, situated between lat. 57° and 50° N., has a mean annual temperature of from 40° to 50°, and includes within it by far the finest part of Russia. The warm region from 50° southwards is exposed to a summer heat often exceeding 100°. As regards soil large sections of Russia are sandy, barren wastes and vast morasses. The most productive portion is that between the Baltic and the Gulf of Finland, and the Volga, on the N. and E.; Prussia, Austria, &c., on the W.; and the Black Sea on the S. It has, generally speaking, a soft black mould of great depth, mostly on a sandy bottom, easily wrought, and very fertile. The more southerly portion of Siberia, as far east as the river Lena, has, for the most part, a fertile soil, and produces, notwithstanding the severity of the climate, most kinds of grain.

Vegetable Products, Agriculture.—Boundless forests exist, especially in the northern European provinces and the more temperate parts of Siberia, the area of the forest land in Europe being 42 per cent of the total area. The fir, larch, alder, and birch predominate. In the south forests are less abundant, and the tracts around the Black Sea and the Caspian, and the immense steppes of the south and east, are almost wholly destitute of wood. The reckless cutting down of trees has in many parts rendered wood scarce, especially in the vicinity of great cities. Most of the forest land is now under government control, and waste is prevented. Agriculture remains the chief pursuit of the bulk of the population. For some years it has, however, remained stationary, while manufacturing industries are steadily going ahead. The chief crops are rye, wheat, barley, oats, hemp, flax, and tobacco. Vine and beet culture is rapidly increasing, and the breeding of horses and cattle is also extensively carried on. Two-fifths of the land of Russia Proper are held by the state, mostly forest and waste, one-fourth by landed proprietors, and about one-third by peasants.

Zoology.—Among wild animals may be mentioned the bear, the wolf, wild hog, elk, and various animals which are hunted for their furs. Wild fowl abound, particularly near the mouths of rivers. Both on the coasts and in the rivers a great number of productive fisheries are carried on. In the Arctic Ocean vast numbers of seals are taken. The rivers of the Caspian, particularly the Ural and Volga, and the Sea of Azoff, are celebrated for their sturgeon. In the same quarters are also important salmon-fisheries. In the regions bordering on the Arctic Ocean large herds of reindeer are kept; and in the south, among the Tartars of the Crimea and the inhabitants of the Caucasus, the camel is often seen.

Minerals. — Russia is rich in minerals. Gold, platinum, silver, copper, iron, lead, manganese, coal, salt, and saltpetre all exist in abundance, and there are copious petroleum springs in the Caspian region. The precious metals are chiefly obtained in the Ural and Altai regions, the annual production averaging: gold, 7200 lbs.; platinum, 5000–7000 lbs.; silver, 21,000–25,000 lbs. In the Ural, iron beds are also rich and numerous, exceeding all others in productiveness. Copper is most abundant in the government of Perm; lead in the Ural and some parts of Poland; saltpetre in Astrakhan. Of the coal-mines those of the Don basin are the principal at present, those of Kielce ranking second; the mines around Moscow come next. About 60,000 tons of manganese ore are annually extracted in the Ural and the Caucasus. The petroleum wells of Baku on the Caspian now send their products all over Europe.

Manufactures.—Prior to the accession of Peter the Great Russia had no manufactories; he started them, and under the more or less fostering care of his successors they have steadily grown. Especially since 1865 a number of important industries have developed, this being mainly due to Russia's protective policy. The latest statistics give about 1,000,000 persons as being employed in the various manufacturing industries. Two-fifths of the entire production come from the governments of St. Petersburg and Moscow. Next in importance as industrial centres rank Vladimir, Kieff, Perm, Livonia, Esthonia, Kharkoff, and Kherson in the order indicated. Arranged according to the money value the various manufactures rank as follows: spirits, sugar, cottons and yarns, flour, tobacco, foundry products, flax, yarn and

linen, leather, woollen cloth and yarn, iron, machinery, beer, soap, timber, paper, oil, glass, chemicals, agricultural implements.

Trade.—The bulk of Russia's external trade is carried on through the European frontier, and the Baltic and Black Sea ports. The chief exports are: grain (about one-half of entire exports), flax, linseed and other oleaginous seeds, timber, hemp, wool, butter and eggs, spirits, bristles, and furs, in the order indicated. The chief imports are cotton, wool, tea, machinery, coal and coke, cotton yarn, metal goods, wine, olive-oil, raw silk, herrings, textile goods, fruit, coffee, tobacco. The import trade is heaviest with Germany, Great Britain, China, United States, in order named. In the export trade Great Britain takes the lead, Germany, the Netherlands, France, Austria, Hungary following. The imports usually amount to between £45,000,000 and £50,000,000 sterling annually, the exports being perhaps a half more. The more rapid development of the vast natural resources and trade of Russia is prevented by transport difficulties. The magnificent river and canal system is not available for a good part of the year, and railways are comparatively limited. In the year 1896 there were 23,556 miles of railways in operation in the Russian Empire, or 2200 more than in the United Kingdom. Chief among undertakings in progress is the great Siberian railway, from Tomsk to Vladivostock, with branches to important centres. An important line recently constructed is the Transcaspian railway, from Michailovsk, on the southern shore of the Caspian, to Samarcand via Bokhara. The latter is pre-eminently a military line, but it will also largely stimulate trade in the heart of Asia. In 1895 there were over 76,000 miles of telegraph. Trade is further assisted by immense fairs, which are much frequented by European and Asiatic merchants. The principal is that of Nijni-Novgorod, with a turnover of £30,000,000 sterling. Russia has now twelve towns with a population exceeding 100,000, viz.: St. Petersburg, Moscow, Warsaw, Odessa, Riga, Kharkoff, Kieff, Kazan, Saratoff, Kishineff, Lodz, and Wilna. The leading ports are Archangel and Onega on the White Sea; Abo, Helsingfors, and Viborg in Finland; Cronstadt, St. Petersburg, and Reval on the Gulf of Finland; Riga on the Gulf of Riga; Libau on the Baltic; Odessa and Nicolaieff on the Black Sea; Kertch in the Crimea; Taganrog on the Sea of Azoff; and Astrakhan, Baku, and Kizliar on the Caspian. Other ports are being fostered by government in the south. The silver rouble, containing 278 grains of fine silver, is the money unit, value about 3*s.* 2*d.* It is divided into 100 kopecks. In actual circulation there is little else than paper-money.

Government, &c.—Russia is an absolute hereditary monarchy, the emperor (czar or tsar) being the supreme ruler and legislator, and the final tribunal in all matters political or ecclesiastical. The present emperor's income is about 2½ millions sterling. His title is Emperor and Autocrat of all the Russias, Czar of Poland, and Grand-prince of Finland. The administration is divided into ten departments, formerly eleven, with a minister at the head of each nominated by the emperor. Holding a distinct position from these are four great boards or councils. The first is the state council, a permanent body composed of an unlimited number of high officers appointed by the emperor, and presided over by a member of the imperial family; it institutes and elaborates all laws for the decision of the emperor. These laws are initiated by the respective ministers acting directly under the emperor. The second council is the council of ministers, presided over by the minister of justice. The third is the senate of the empire, a superior court of appeal. The Holy Synod is the fourth council, a body of high church dignitaries. There are in addition a special imperial cabinet and two private cabinets, to which the rest of the councils are subject. Finland has nominally preserved its ancient constitution with a national parliament of four estates, but it is really ruled by a governor-general and senate appointed by the emperor. Some of the Baltic provinces also possessed certain privileges, but these are being gradually curtailed. Each government of the empire is under a governor and vice-governor; there are also a few general-governors, who have more than one government under them. The communes into which the provinces and districts are divided possess a certain amount of local government, and elect their own local dignitaries, but these are again subject to an all-powerful police. Russia is heavily in debt, chiefly abroad, Germany in particular holding large amounts of Russian stocks. The total internal and external debt is calculated at £728,000,000. The estimated revenue for 1896 was £140,000,000, the expenditure being the same. The bulk of the

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revenue is obtained by indirect taxation, spirits furnishing about one-third of it; other items are personal and land taxes, trade licenses, tobacco and sugar, customs.

Army and Navy.—Russia possesses one of the most powerful armies in the world. On a peace footing it is placed at 800,000 men, the war strength at 2,490,000. Besides these it is calculated that in an emergency the territorial reserve could supply 2,000,000 more men, the national militia 1,200,000, making a total of nearly 5½ million men. Liability to military service is universal from the age of 20 to that of 43; and five years must be passed in active service. The navy comprises 18 vessels classed as battleships, 16 port-defence vessels, 73 cruisers, besides torpedo craft, &c., and is manned by 30,000 sailors.

Religion and Education.—The established religion of Russia is the Eastern or Greek Church, and one of the fundamental laws of the state is that the emperor must belong to that church, and none of the imperial family may marry a wife belonging to another religion without the express sanction of the emperor. Most religions are tolerated, but Roman Catholics, and especially Jews, are frequently subject to interference and even persecution. Education in spite of many obstacles is progressing, but Russia (Finland excepted, which has all but universal education) is still nearly a century behind other European nations, perhaps Spain and Portugal excepted. Only 2·3 per cent of the aggregate population receive education in schools. A law was passed in 1888 to spread technical education. There are 9 universities, with more than 900 professors and 13,500 students.

People.—The population of Russia is increasing faster than that of any other European nation, Great Britain, perhaps, excepted. As regards language (and so far also race) the peoples of Russia are comprised under the two great divisions of Aryans and Mongolians; the former include Slavonians, Germans, and Greeks, the latter the Finnish and Tartar races. The Slavonians form about 86 millions of the population, including 6½ million Poles. There are about 5½ million Fins, 2½ million Lithuanians, and some 3½ million Jews. Of Germans about 1½ million reside in Russia, of Roumanians and Servians 2½ millions. There are some 2½ million Georgians, Ossetes, and Lesghians, and 1 million Armenians. The Turco-Tartars count about 10 millions. A gradual absorption by the Slavonic races is going on. The political divisions of the Russian people comprise numerous grades of nobility, which are partly hereditary and partly acquired by military and civil service, especially the former, military rank being most highly prized in Russia. The clergy, both regular and secular, form a separate privileged order. Previous to the year 1861 the mass of the people were serfs subject to the proprietors of the soil. The Emperors Alexander I. and Nicholas took some initial steps towards the emancipation of this class; but a bold and complete scheme of emancipation was begun and carried out by Alexander II. in 1861.

Language.—A number of languages and a vast variety of dialects are naturally spoken in a country comprising such a heterogeneous population, but the Russian is the vernacular of at least four-fifths of the inhabitants, the literary and official language being specifically the 'Great Russian,' or that belonging to Central Russia surrounding Moscow. It is one of the Slavonic family of the Aryan or Indo-European languages, and as such is a sister of Greek, Latin, Sanskrit, German, English, &c. (See *Philology.*) Modern Russian has been much modified by the introduction of Greek, Tartar, and Mongolian terms. It has an alphabet of thirty-seven letters, a written and printed character of a peculiar form (see *Cyrillian Letters*), and a pronunciation which it is hardly possible for any but natives to master. Its flexions are both numerous and irregular; but it is soft, sonorous, remarkable for its copiousness, and affords unbounded facility for rhyme.

Literature.—The introduction of Christianity in 988 first created a taste for letters among the ancient Slavonians, but the chief remains of that early literature are some fragments of traditionary tales in rhythmic verse, which have recently excited much attention on account of their similarity to the English, Spanish, and Scandinavian ballads. Among the earliest works reduced to writing is a book of the Gospels dating from 1056 or 1057. The Tartar invasion arrested the progress of literature, and Russia fell back into barbarism, whence she only emerged again after the accession of the house of Romanoff (see below). The revival of literature was at first confined to some crude and feeble dramatic performances, and towards the close of the 17th and the beginning of the 18th centuries, to poor imitations of French, German, and other foreign works.

Lomonosof (1711–65) wrote a number of works both in prose and verse, and by his precepts and example did much to originate a national literature, and to fix the grammar of the language. His contemporary Sumarokoff carried the drama to a high degree of perfection; Derzhawin (1743–1816) distinguished himself highly in lyrical and other poetry; and since then many writers have distinguished themselves in all departments. It is, however, principally to Karamsin (1725–1826) that Russia owes the more general spread of literary taste. The foundation of the Russian Academy in 1783, and the issue of its great dictionary, also contributed largely towards it. The same perfection which Karamsin gave to prose, Dimitrieff gave to poetry. Of the more modern authors particular mention is due to Alexander Pushkin, Russia's greatest poet, and Michael Lermontoff, not far his inferior. The most eminent novelists are Nicholas Gogol, Ivan Turgenieff, Feodor Michailovitch, Dostoieffsky, Alexander Herzen, and Count Leo Tolstoi, the last the greatest of the living fiction writers of Russia. Russia possesses a number of valuable libraries. The first Russian press was set up at Moscow in 1554.

History.—The origin of the Russian empire is involved in much obscurity, but it is usually regarded as having been founded by Rurik, a Scandinavian (Varangian), about 862, his dominions and those of his immediate successors comprising Novgorod, Kieff, and the surrounding country. Vladimir the Great (980–1015), the Charlemagne of Russia, introduced Christianity, and founded several cities and schools. But from this period down to 1237, when the country was overrun by the Tartars, Russia was almost constantly the scene of civil war. For more than two centuries Russia continued subject to the Tartars, while on its opposite frontier it was exposed to the attacks of the Poles and Teutonic knights. In 1328 the seat of government was transferred from Novgorod to Moscow; and in 1481 the Tartars were finally expelled under Ivan the Great (1462–1505). Ivan extended the Russian dominions, married the niece of the last Byzantine emperor, and ever since the rulers of Russia have looked with longing eyes upon the territories of which the Byzantine empire consisted. Ivan the Terrible (1533–84) did much to extend and consolidate the Russian territory, and in particular began the conquest of Siberia, which was completed in 1699. In 1613 the house of Romanoff, whence the present czar is descended, was raised to the throne, and from this period the empire gained greater strength and consistency. Under Alexis Mikhailovitch (1645–76) White Russia and Little Russia were conquered from the Poles, and the Cossacks of the Ukraine acknowledged the supremacy of the czar; various internal improvements were effected, and the power of Russia began to be felt and feared by all her neighbours. But Russia's real greatness may be said to date from the accession of Peter the Great in 1696, who first secured the country the attention of the more civilized nations of Europe. His first military achievement was his conquest of Azoff from the Turks in 1699, which, however, he lost again in 1711. He also completed the conquest of Siberia; and, what was of more importance, obtained from Sweden by the Peace of Nystadt in 1721 Livonia, Esthonia, Ingria, or part of Karelia, the territory of Viborg, Oesel, and all the other islands in the Baltic from Courland to Viborg. Catharine I., widow of Peter I., succeeded on the death of the latter, but died after a reign of only two years. The throne was then occupied successively by Peter II., 1727–30; by Anna, 1730–40; by Ivan VI., 1740–41; by Elizabeth, 1741–62; by Peter III., about six months in 1762; by Catharine II., wife of Peter III., 1762–96; by Paul, 1796–1801; by Alexander I., 1801–25; by Nicholas, 1825–55; by Alexander II., 1855–81. During all these reigns the growth of the empire was continuous. The Kirghiz Cossacks were subdued in 1731, the Ossetes in 1742; the Finnish province of Kymenegard was gained by the Treaty of Abo in 1743. The three partitions of Poland took place under Catharine II. in 1772, 1793, and 1795. Russia acquired nearly two-thirds of this once powerful state. By the Peace of Kutchuk-Kainarji in 1774, the Turks gave up Azoff, part of the Crimea (the other part was taken possession of in 1783), and Kabardah; and by the Peace of Jassy in 1792, Oczakov. Georgia also came under the protection of Russia in 1783, and Courland was incorporated in 1795. A portion of Persian territory had already been acquired; and in 1801 the formal annexation of Georgia was effected. The Peace of Frederickshaven, 1809, robbed Sweden of the whole of Finland, which now passed to Russia; the Peace of Bukarest, 1812, took Bessarabia from the Turks; that of Tiflis, 1813, deprived the

Persians of parts of the Caucasus; and then the Vienna Congress of 1815 gave the remainder of Poland to Russia. After fresh wars the Persians lost the provinces of Erivan and Nakhichevan in 1828; and the Turks lost Anapa, Poti, Akhalzik, &c., by the Peace of Adrianople in 1829. The desire to possess further dominions of the Sultan led to a war against Turkey in 1853, in which England, France, and Sardinia also took part in 1854, and which ended in the Peace of Paris, 1856. (See *Crimean War.*) The Russians were compelled to restore to Moldavia the left bank of the Danube in Bessarabia. This district, however, was again restored to Russia by the Congress of Berlin in 1878, which followed the Russo-Turkish war of 1877–78. (See *Ottoman Empire.*) In 1858 Russia acquired by agreement with China the sparsely populated but widely extended district of the Amur; the subjection of Caucasia was accomplished in 1859 and 1864, and considerable conquests have followed since 1866 both in Turkestan and the rest of Central Asia. A ukase of 1868 annihilated the last remains of the independence of Poland by incorporating it completely in the czardom. On the other hand, Russian America was sold to the United States in 1867. The following table will show at a glance the extent of these continuous accessions of territory:—

The extent of Russian territory under—

Ivan the Great,	1462,	about	382,716 sq. m.
Vassili Ivanovitch,	1505	,,	510,288 ,,
Ivan the Terrible,	1584	,,	1,530,864 ,,
Alexis Michaelovitch,	1650	,,	5,039,094 ,,
Peter I.,	1689	,,	5,953,360 ,,
Anna,	1730	,,	6,888,888 ,,
Katharine II.,	1775	,,	7,122,770 ,,
Alexander II.,	1868	,,	7,866,940 ,,
Do.,	1881	,,	8,325,393 ,,
Alexander III.,	1887	,,	8,644,100 ,,

The population from 14 millions in 1722 has grown to 108 millions in 1887. The extension of the Russian empire in the east is still going on. In 1881 the Tekké Turcomans were subjected; in 1884 Merv was taken, and Penjdeh was occupied and annexed in 1885, which led to considerable friction between Russia and Britain. Of late years a great disturbing element to the government of Russia has sprung up in Nihilism (see *Nihilists*). The murder of the late emperor Alexander II. in the streets of St. Petersburg, by means of a bomb, was their doing; and repeated attempts on the life of his successor Alexander III. were also made. Alexander III., second son of Alexander II., became emperor in 1881 and died in 1894. He was succeeded by his eldest son, Nicholas II., who is married to Princess Alexandra Alix of Hesse.

Russia Leather is prepared in Russia chiefly from cow-hides tanned with willow, poplar, and larch bark, and is saturated with birch-bark oil, which gives it its peculiar odour. It is highly esteemed for its durability and imperviousness to water and insects, and is dyed in various colours, red and brown being the most frequent. It is much used for book-bindings and fancy articles. Similar leather from cow-hide is made of good quality in the U. States. Large quantities of imitation Russia leather are made in Paris, but it lacks durability.

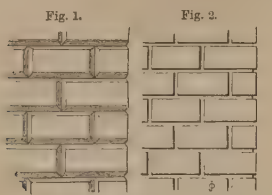
Russniaks. See *Ruthenians.*

Rust, peroxide of iron, formed by the gradual oxidation of iron when exposed to the air. To remove rust the usual mode is to rub the object with a piece of oiled rag or emery paper. More rapid and more satisfactory results are secured by using very pure petroleum, and wiping with a hempen or woollen rag. To prevent rust, dip iron or steel articles in a mixture of equal parts of carbolic acid and olive-oil, rubbing the surface with a rag. Others rub the metal with a mercurial ointment, leaving a thin layer over the entire surface. If iron be dipped in a solution of carbonate of potash or soda in water the surface will be protected against rust for a long time, and objects can be protected for any period by burying in quicklime. Rubbing the surface with plumbago has a similar effect.

Rust, a disease which attacks cereals and many pasture grasses, known also by the names of red-gum, red-rag, red-robin. It is most common on the leaves, on which it is visible in the form of orange-coloured mealy spots, but is by no means confined to them. It is produced by a species of fungus, the growth of which seems to be specially favoured in ill-ventilated fields under excessive summer heat.

Rustchuk, a town of Bulgaria, situated on the right bank of the Danube, where that river is joined by the Lom, opposite Giurgevo, and 42 miles south by west of Bukarest. Its position makes it a place of considerable strategic importance. It was nearly destroyed by the Russian bombardment during the Russo-Turkish war of 1877–78, and the fortifications have been dismantled by order of the Berlin Congress. Pop. 27,198.

Rustic Work, in masonry, is a term applied where the surface of a wall shows



Rustic Work.
1, With chamfered joints. 2, With rectangular joints.

grooves between the different courses of stones, thus giving the appearance of open joints. There are many varieties of it.

Rutabaga, a name for the Swedish turnip. See *Turnip*.

Ruta'ceæ, a nat. order of polypetalous exogens. They are shrubs or trees, rarely herbs, the simple or compound leaves dotted with glands, often having a strong heavy smell. About 700 species are known, occurring most abundantly in Australia and South Africa. A South American species produces the Angostura-bark. The bark of a Brazilian species, the *Ticorĕa febrifūga*, is a powerful medicine in intermittent fevers. Dittany abounds in volatile oil to such a degree that the atmosphere surrounding it actually becomes inflammable in hot weather.

Ruth, Book of, a canonical book of the Old Testament. It is a kind of appendix to the Book of Judges, and an introduction to those of Samuel, and is therefore properly placed between them. The story of Ruth records in simple language the ancient rights of kindred, redemption, and other interesting customs of Hebrew antiquity. The date of the history and the name of its writer are unknown, but it is probably of a date subsequent to the captivity.

Ruthe'nians, Russin'ians, Russniaks, Red or Little Russians, numerous Slavonic tribes inhabiting Eastern Galicia, Bukowina, and North-eastern Hungary, closely allied to the inhabitants of Podolia and Volhynia. The number of Ruthenians in the Austrian Empire amounts to 3,000,000, of whom about 500,000 are settled in Hungary. They live almost exclusively by agriculture, and their state of civilization is still very low. They belong for the most part to the United Greek Church, and in politics often prove troublesome to the Austro-Hungarian Empire on account of their Russian proclivities.

Ruthe'nium, a metal occurring in platinum ore. Symbol Ru; atomic weight, 104; specific gravity, 11 to 11·4; colour, whitish-gray. It is very infusible, and forms a series of salts which are analogous to those of platinum.

Rutherford, or Rutherfurd, Samuel, Scottish divine, was born about the year 1600 in Roxburghshire, died at St. Andrews 1661. He studied at Edinburgh University, took his degree of M.A. in 1621, and in 1627 was appointed minister of Anwoth in Kirkcudbright. On account of his strong Presbyterian views he was deprived of his living in 1636 and imprisoned for two years, when he was restored. He took a prominent part in the drawing up of the National Covenant. In 1639 he became professor of divinity, and in 1649 principal of the new college, St. Andrews. He published numerous politico-theological treatises. The most famous of these is Lex Rex, which on the Restoration was publicly burned, and he himself charged with high treason. Death prevented him from answering the charge before parliament. His Familiar Letters, published after his death, have been frequently reprinted.

Ruth'erglen, commonly called Ruglen, an ancient royal, parliamentary, and municipal burgh in Scotland, county of Lanark, 2 miles south-east of Glasgow, on the left bank of the Clyde. It consists chiefly of one wide street, on which stands a fine baronial structure, the municipal buildings and town-hall. There are chemical works and dye-works, a paper-mill, a pottery, a building-yard for small steamers; and in the vicinity coal-mines. Rutherglen was erected into a royal burgh by David I. about 1126. It belongs to the Kilmarnock district of parliamentary burghs. Pop. 13,361.

Ruthin, Rhuddin, or Rhuthyn, a municipal and parliamentary borough in North Wales, beautifully situated on the Clwyd, in the county of Denbigh. Near it are the remains of a magnificent old castle called Rhyddin, or Red Fortress. Ruthin belongs to the Denbigh district of parliamentary boroughs. Pop. 2760.

Ruthven, Raid of, in Scottish history, an act of treachery by which the Earl of Gowrie and his party, on the 22d of August, 1582, secured themselves for ten months the control over the person and power of James VI. The king, then only sixteen years of age,

was surrounded at Ruthven Castle, the seat of the Earl of Gowrie, where he had gone on a hunting expedition. He was set free by the opposition party at St. Andrews (29th June, 1583), and the Earl of Gowrie was beheaded.

Rutile, red oxide of titanium, a brown, red, yellow, and sometimes nearly velvet-black ore. It is found in many European countries, in North America, and the Urals, chiefly in the veins of primitive rocks. It is infusible before the blow-pipe without a flux. Potters have used the metal to give a yellow colour to porcelain.

Rutland, or RUTLANDSHIRE, the smallest of the English counties, surrounded by the counties of Lincoln, Leicester, and Northampton; area, 94,889 acres. The surface is beautifully diversified by gently-rising hills. The prevailing rock is a close-grained limestone. The soil is almost everywhere loamy and rich. The west part of the county is under grass, and the east chiefly in tillage. It is famous for its sheep, wheat, and cheese, much of the latter being sold as Stilton. It returns one member to parliament. Pop. 20,659.

Rutland, a town of the United States, capital of Rutland county, Vermont, 117 miles N.N.W. of Boston. It is an important railway junction, and has valuable white marble quarries in its vicinity. Pop. 11,760.

Ruvo di Puglia (pụl'yà), a town of S. Italy, prov. Bari, with a handsome cathedral. Pop. 17,728.

Ruysdaal (rois'dăl), or RUYSDAEL, JACOB VAN, one of the most distinguished Dutch landscape-painters, born at Haarlem probably about 1625, died in the poorhouse of his native place 1682. His paintings, but little appreciated during his lifetime, now bring great prices. Fine examples of his works are to be seen in the National Gallery at London, and in the Louvre at Paris. Landscapes with dark clouds hanging over them, lakes and rivulets surrounded by overhanging trees, &c., are his subjects, and are represented with true poetic feeling and admirable technique. It is said that the figures in his paintings were executed by A. van de Velde, Philip and Pieter Wouwerman, C. Berghem, and others.

Ruyter (roi'ter), MICHIEL ADRIAANSZOON DE, a celebrated Dutch admiral, born at Flushing in 1607, died 1676 in the port of Syracuse from a wound received in an engagement with the French. He rose to his rank from the situation of cabin-boy, and distinguished himself for remarkable seamanship and bravery in many naval battles, but more especially in 1653, in 1666, and in 1672, against the British fleet. He was buried at Amsterdam, where the states-general erected a monument to his memory.

Ry'an, LOCH, an arm of the sea, on the N.W. of Wigtownshire, Scotland, extending inland about 9 miles, varying from 2 to 4 miles in breadth, and affording safe anchorage. At the head of the loch lies Stranraer.

Rybinsk', or RUBINSK, a town in Russia, government Jaroslav, on the Volga, at the confluence of the Rybinska. It is a busy place in the open season, as the goods arriving by river steamer are here transhipped into smaller craft, which can then proceed by canal to St. Petersburg. Pop. 29,275. increased to 100,000 during the shipping months.

Rycaut (ri-kạt'), SIR PAUL, an English writer and diplomat, born about 1630. He was of good family, and obtained his B.A. degree at Cambridge in 1650. He travelled extensively on the Continent and in the East. From 1661–69 he acted as secretary of legation at Constantinople, and subsequently for eleven years as consul at Smyrna. In these diplomatic offices he acquired considerable knowledge of the East, which he embodied in several historical works, as The Present State of the Ottoman Empire, The Present State of the Greek and Armenian Churches, &c. After his return he received several important government appointments; James II. knighted him, and William III. made him resident at the Hanse Towns. He died in 1700.

Ryde, a municipal borough and watering-place of England, on the north-east side of the Isle of Wight. It consists of several regular and well-built streets, and numerous detached villas surrounded by gardens, rising in terraces from the sea, and presenting a very pleasing appearance. A park on a rising ground to the east of the town, and the pier, form delightful promenades. Pop. 10,952.

Rye (*Secāle cereāle*, natural order Gramineæ), a species of grain of which there are several varieties. It is an esculent grain bearing naked seeds on a flat ear, furnished with awns like barley. It is a native of the Levant, but has been cultivated in Europe from time immemorial. It thrives in climates and in soils which forbid wheat; requires less manure, and ripens faster. It is extensively grown in Northern

Eyrbyggia Saga, a saga of very mixed contents; the Laxdœla Saga, the story of the Icelandic heroine Gudrun; the Saga of Grettir the Strong; the Saga of Nial, a complex saga of great legal and historical value. A number of the most interesting sagas are to be had in English translations.

Sage, the common name of plants of the genus *Salvia*, a very large genus of monopetalous exogenous plants, nat. order Labiatæ, containing about 450 species, widely dispersed through the temperate and warmer regions of the globe. They are herbs or shrubs of widely varying habit, usually with entire or cut leaves and various-coloured (rarely yellow) flowers. The best known is the *S. officinālis*, or garden sage. This plant is much used in cookery, and is supposed to assist the stomach in digesting fat and luscious foods. Sage-tea is commended as a stomachic and slight stimulant.

Sage-brush (*Artemisia Ludoviciana*), a low irregular shrub of the order Compositæ, growing in dry alkaline soils of the N. American plains. The name is also given to other American species of *Artemisia*.

Sage-cock. Same as *Cock-of-the-Plains*.

Saghalien, SAGHALIN (saḥ'a-lēn), a long island in the North Pacific, separated from Manchuria by the Gulf of Tartary, opposite the mouth of the Amoor; area, 24,560 square miles. The centre is mountainous. There are three parallel ridges running from north to south, from 2000 to 5000 feet above sea-level, and densely covered with conifers. Climate, flora, and fauna are almost Siberian. The inhabitants consist of Russians (many of them convicts), Japanese, Ainos, &c., altogether some 20,000. The island formerly belonged to the Chinese Empire, but early in this century the Japanese took possession. In 1875 the Russians obtained its cession from Japan.

Saginaw (sag-i-nạ'), a city of the U. States, capital of Saginaw county, Michigan, on both sides of the Saginaw River, here navigable for the largest lake craft, about 17 miles from Lake Huron. Saginaw is well supplied with railway connections; and there are numerous saw-mills and other industrial establishments. Pop. 46,322.

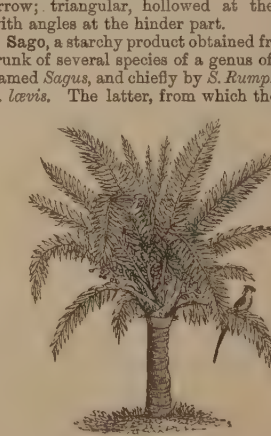
Sagitta (sa-jit'a), a genus of annelids, forming the order Chætognatha. This animal is a transparent marine form, straight and slender, attaining the length of about an inch. The head carries a series of setæ or bristles surrounding the mouth, and the hinder margin of the body is fringed with a sort of fin. The species are found living in the open sea all over the world.

Sagitta'ria. See *Arrow-head*.

Sagitta'rius (the Archer), in astronomy, the ninth sign of the zodiac, into which the sun enters November 22. The constellation consists of eight visible stars. It is represented on celestial globes and charts by the figure of a centaur in the act of shooting an arrow from his bow.

Sagit'tate, in botany, a term applied to the form of leaf shaped like the head of an arrow; triangular, hollowed at the base, with angles at the hinder part.

Sago, a starchy product obtained from the trunk of several species of a genus of palms named *Sagus*, and chiefly by *S. Rumphii* and *S. lævis*. The latter, from which the finest



Sago Palm (*Sagus lævis*).

sago is prepared, forms immense forests on nearly all the Moluccas, each stem yielding from 100 to 800 lbs. of sago. The tree is about 30 feet high, and from 18 to 22 inches in diameter. It is cut down at maturity, the medullary part extracted and reduced to powder like sawdust. The filaments are next separated by washing, and the meal laid to dry. For exportation the finest sago meal is mixed with water, and then rubbed into small grains of the size and form of coriander seeds. The Malays have a process for refining sago, and giving it a fine pearly lustre, the method of which is not known to Europeans; but there are strong reasons to believe that heat is employed, because the starch is partially transformed into gum. The sago so cured is in the highest estimation in all the European markets. Sago forms a light, wholesome, nutri-

tious food, and may be used to advantage in all cases where a farinaceous diet is required. It is also largely used in the manufacture of soluble cocoas, and for adulterating the common sorts of arrowroot. For Portland-sago see *Arum*.

Sa'goin, or SAGOUIN, the native South American name of a genus (*Callithrix*) of Brazilian monkeys of small size, and remarkably light, active, and graceful in their movements.

Sagor. See *Saugor*.

Saguenay (sag'e-nā), a river of Canada, prov. of Quebec, formed by two outlets of Lake St. John, which unite about 9 miles below the lake, from which point the river flows S.E., and falls into the St. Lawrence at Tadousac Harbour; length about 100 miles. For many miles of the latter part of its course the banks are very lofty, and in some parts there are precipices more than 1000 feet high. Ships moor at rings fixed into some of the precipitous walls of rock, the water being so deep as to be unsuitable for anchorage. The Saguenay is navigable for vessels of any size to Ha Ha Bay, a distance of about 50 miles to 60 miles from the St. Lawrence, and at high-water for vessels of large dimensions from 15 miles to 18 miles farther. It is visited by many tourists on account of its remarkable scenery.

Sagun'tum, formerly a town in Spain south of the Ebro, about 3 miles from the coast. It is famous in Roman history; its siege by Hannibal in 219–218 B.C. having given rise to the second Punic war. The site is occupied by the modern town of Murviedro.

Sahara (sa-hā'ra; properly sä'hȧ-rä), THE, that vast and mainly desert tract of Northern Africa lying north and south of the Tropic of Cancer, between the Atlantic and the Nile. In the north it extends to and forms part of Morocco, Algeria, Tunis, Tripoli, and Egypt; in the south it is chiefly bounded by the Soudan. This immense area, calculated at over 3½ million square miles, is not, as popularly supposed, a great level desert; on the contrary, it offers considerable variety of configuration and vegetation. The surface ranges from below sea-level to 8000 feet above it. There are the extensive and elevated plateaux of Tasili, Tibesti, &c., about the centre of the Sahara, running from the north in a south-easterly direction, and presenting some very high mountain masses. Between Tibesti and the Niger we have the elevated region of Air, and towards the Atlantic Adrar. These plateaux are intersected by many fertile valleys fit for agriculture and pasture. Other parts of the desert are broken by large oases with a most luxuriant vegetation, such as Twat, Wargla, and Fezzan. On the borders of Algeria oases have been created artificially by means of artesian wells. A vast tract of true desert, El Djuf, lies in the west-central region, and unites all the worst characters of the desert — want of water, intense heat, and moving sands. In the desert proper there is little of animal or of vegetable life. A few species of antelopes, the wild ass, the mountain sheep, the hyæna, the baboon, the tortoise, and the ostrich, are met with in favoured spots. Lizards, jerboas, and serpents of many kinds retain undisturbed possession of the burning sands. Where herbage exists it is mainly composed of such plants as require but little moisture. The vegetable wealth of the desert-dweller lies in the date-palm. The population, estimated at about 2½ millions, consists of various tribes of Arabs, Berbers, and negroes. The Berbers are almost confined to the west-central, and the negroes to the east-central parts, while the Arabs predominate in the other regions. Camel-breeding, slave and salt dealing, caravan conducting, and brigandage form the chief occupations of a large section. A number of caravan routes through the Sahara connect Timbuctoo and the Soudan with the maritime countries in the north. Recent explorations have finally disposed of the idea that the Sahara is the dried-up bed of a former inland sea, and that it could be restored to its former condition by admitting the waters of the ocean. The diluvial sea theory is now limited to the low-lying districts, El Djuf and Kufra, which abound in rock-salt deposits. Spain annexed in 1887 the coast between Morocco and Senegal, and by treaty with the Adrar sheiks secured considerable territory inland.

Sahárunpur (sa-hä-ran-pur'), a town in Hindustan, capital of the district of the same name, in the North-west Provinces. It has many handsome residences in the European style, a government stud, a botanic garden, and a large sugar and grain trade. Pop. 63,194.

Sahib, the usual term of address by natives of India towards a European gentleman.

Sai (sä'ī), the name applied to the weeper-monkey of Brazil. See *Sapajou*.

differently, but after their return from Egypt Nehemiah exerted himself to secure the true observance. Gradually the original law became encumbered with a long list of petty pharisaical and rabbinical regulations. The Sabbath began at sunset on Friday and ended at sunset on Saturday. On the Sabbath the Jews were not allowed to go out of the city further than 2000 paces, that is, about a mile, and this distance was called a *Sabbath-day's journey*. And as every seventh day was a day of rest to the people, so was every seventh year to the land. It was unlawful in this year to plough or sow, or prune vines; and if the earth brought forth anything of its own accord, these spontaneous fruits did not belong to the master of the ground, but were common to all. This year was called the *Sabbatical year*, and was also to be a year of release for Jewish debtors. In the Gospels the references to the Sabbath are numerous, and they show us that Christ always paid respect to the institution although he did not regard the minute prohibitions that had been added to the original law. The desire of distinguishing the Christian from the Jewish observance early gave rise to the celebration of Sunday, the first day of the week, instead of the Sabbath. In 366 the Council of Laodicea removed all scruples as to the duty of Christians to keep the Jewish Sabbath. See *Sunday*.

Sabellians. See *Sabellius*.

Sabellius, a Christian teacher at Ptolemais in Upper Egypt, who lived about 250, and is known as the founder of a sect who considered the Son and Holy Ghost only as different manifestations of the Godhead, but not as separate persons. He taught that as man, though composed of body and soul, is but one person, so God, though he is Father, Son, and Holy Ghost, is but one person. Dionysius of Alexandria wrote against Sabellius, and Pope Dionysius condemned him in a council held at Rome in 263. As a sect the Sabellians are extinct since the beginning of the 5th century, but their views have always found adherents.

Sa'bians, or **Sabæans**, a name improperly given by writers of the middle ages to heathen star-worshippers. It is also given to a sect which arose about 830, and whose members are also called Pseudo-Sabians, or Syrian-Sabians, from the fact that the sect originated among the Syrians of Mesopotamia. Their religion is described as the heathenism of the ancient Syrians, modified by Hellenic influences. This sect flourished for about two centuries. See also *Christians of St. John*.

Sabicu', or **Savicu'**, a leguminous tree, *Lysiloma Sabicu*, native of Cuba. It furnishes an exceedingly heavy and hard wood, with a texture as smooth, close, and firm as ivory almost, and of a rich, warm, red colour. It is much employed for shipbuilding and cabinet-making.

Sab'ine, river of the United States of America. It rises in the north-eastern part of Texas, and after a course of some 500 miles flows into the Gulf of Mexico through Sabine Bay. It is too shallow to be of much use for navigation.

Sab'ine, Sir Edward, a British astronomer and physicist, born at Dublin 1788, died at East Sheen (Surrey) 1883. He was educated for the army at Woolwich, and obtained a lieutenant's commission in the Royal Artillery. Although he gained the rank of major-general in 1859, it is not to his military achievements that he owes celebrity, but to his earnest and long-continued researches in astronomy and physical geography. As astronomer he accompanied Sir J. Ross, and afterwards Sir E. Parry, in search of the North-west Passage, made valuable observations, and collected numerous data regarding the length of the pendulum and the variations of the magnetic needle. He made other voyages to tropical and arctic regions to investigate these and allied subjects, and published his researches in the Philosophical Transactions, and the Transactions of the British Association and the Royal Society. From 1861–71 he presided over the Royal Society, and in 1869 he was created a K.C.B.

Sab'ines (*Sabini*), an ancient people widely spread in Middle Italy, allied to the Latins, and already an important nation prior to the foundation of Rome. Originally they were confined to the mountain districts to the N.E. of Rome, and their ancient capital was Amiternum, near the modern Aquila. As an independent nation they ceased to exist in 290 B.C., when they were incorporated with the Roman state. See *Rome* (*History*).

Sabines, Rape of the. See *Romulus*.

Sable, a digitigrade carnivorous mammal, nearly allied to the common marten and pine marten, the *Mustela zibellina*, found chiefly in Siberia and Kamtchatka, and hunted for its fur. Its length, exclusive of the tail, is about 18 inches. Its fur, which is extremely lustrous, and hence of the very

highest value, is generally brown, grayish-yellow on the throat, and with small gray-

Sable (*Mustēla zibellīna*).

ish-yellow spots scattered on the sides of the neck. It is densest during winter, and owing to the mode of attachment of the hairs to the skin it may be pressed or smoothed in any direction. Two other species of sable are enumerated, the Japanese sable (*M. melanŏpus*) and a North American species (*M. leucŏpus*). The Tartar sable (*M. siberica*) is the name given to a species of the weasel genus found in Northern Russia and Siberia, and the pekan (*M. canadensis*) of North America is sometimes known as the Hudson's Bay sable. The skins of all these varieties are frequently dyed and otherwise manipulated to imitate the true Russian sable. Sable hair is also used in the manufacture of artists' pencils. Sable fur has been of great value from very early times.

Sable, in heraldry, black, one of the tinctures used in blazonry. In engraving it is expressed by perpendicular crossed by horizontal lines. See *Heraldry*.

Sable Island, a low treeless sandy island in the North Atlantic, off the east coast of Nova Scotia, 20 miles long and 1 to 5 broad. It has a refuge for shipwrecked persons and a lighthouse. Many shipwrecks have occurred on it. It is gradually disappearing.

Sables (sä-bl), or SABLES D'OLONNE, a seaport in France, department of Vendée, on the Atlantic. It is built partly on an eminence in the form of an amphitheatre, and partly on a flat, and has a good harbour, valuable fisheries of oysters and sardines, and a considerable trade. It is much resorted to for sea-bathing. Pop. 10,420.

Sabots (sä-bō), wooden shoes made each of one piece hollowed out by boring-tools and scrapers. They are largely worn by the peasantry of several European countries, being well adapted to protect the feet against damp. In France their manufacture forms an important industry. The willow, beech, and ash are the favourite woods for sabot-making.

Sabre, a broad and heavy sword, thick at the back and somewhat curved at the point. It is the chief weapon of cavalry regiments.

Sabre-tache, a leathern case or pocket worn by cavalry officers at the left side, suspended from their sword-belt. It is rather ornamental than useful, and its face bears the regimental emblems, number, &c.

Sacbut, or SACKBUT, a musical instrument of the trumpet kind with a slide; in fact an old variety of trombone (which see). The instrument called *sabbeka* in the Hebrew Scriptures has been erroneously rendered as sacbut by the translators. The exact form of the sabbeka has been much disputed, but that it was a stringed instrument is certain, for the name passed over into Greek and Latin in the forms *sambukē*, *sambuca*, a harp-like instrument of four or more strings. The instrument shown in the ac-

Assyrian Sacbut, from bas-relief.

companying illustration is believed to represent a form of the sacbut of Scripture.

Saccatoo. See *Sokoto*.

Saccharides (-īdz), a name sometimes applied to a group of carbon compounds formed from sugars by the action of various organic acids.

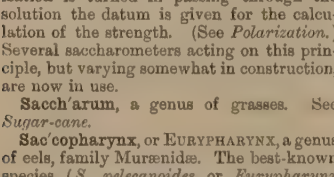
Sacch'arin, an artificial sugar prepared from coal-tar, first introduced to commerce in 1887 by its discoverer Dr. Constantin Fahlberg of Salbke (Germany). Its sweetening properties are enormous; one grain of saccharin is said to sweeten distinctly 70,000 grains of distilled water. It is not a fermentable sugar, and is already in common use in the treatment of disease, as diabetes, for instance; and in many cases in which the palate craves for sweets, but in which ordinary sugar cannot without danger be

permitted. It is also used by stout persons, or those inclined to become so, in order to lessen the formation of fat. To a certain extent it now competes with natural sugars, especially in confectionery and preserving. There is some doubt as to its effects on the human system. The French Conseil d'Hygiène et de Salubrité appointed a commission to inquire into its properties, and their report, issued in 1888, stated that its use in food would seriously affect the digestive functions. The discoverer and other chemists, both British and foreign, have denied, however, that saccharin is injurious, and it is also asserted that the hostility to this sweetening substance emanates chiefly from persons interested in the beet-sugar industry. Saccharin has come largely into use in Germany in the manufacture of confectionery, in brewing, &c.

Saccharom'eter, or SACCHARIMETER, an instrument for determining the quantity of saccharine matter in any solution. One form is simply a hydrometer for taking the specific gravity of the solution; another is a kind of polariscope, so arranged that the solution may be interposed between the polarizer and analyser, and by observing the angle through which the plane of polarization is turned in passing through the solution the datum is given for the calculation of the strength. (See *Polarization.*) Several saccharometers acting on this principle, but varying somewhat in construction, are now in use.

Sacch'arum, a genus of grasses. See *Sugar-cane.*

Sac'copharynx, or EURYPHARYNX, a genus of eels, family Murænidæ. The best-known species (*S. pelecanoides* or *Eurypharynx pelecanoides*) was discovered only a few



Saccopharynx pelecanoides.

years ago. It inhabits the depths of the Atlantic, is of a perfectly black colour, is sometimes 9 feet in length, and but seldom met with. It owes its name to its pouch-like pharynx, which enables it to swallow other fish of large dimensions. The muscular system is but little developed, and the bones are thin and soft.

Sacheverell (sa-shev'ér-el), HENRY, D.D., an English divine of the Establishment, born 1674, died 1724. While preacher at St. Saviour's, Southwark, he in 1709 delivered two bitter sermons against dissent, and accused the existing Whig ministry of jeopardizing the safety of the church. He was impeached in the House of Commons, tried in the spring of 1710, and suspended for three years. This persecution secured him at once the character of a martyr, and helped to stimulate the already fierce passions which then divided the Whig and Tory party. Sacheverell became the popular hero of the hour; while the Godolphin (Whig) ministry was overthrown. Parliament thanked him for his defence of the church, and as soon as his suspension expired, Queen Anne presented him with the rich living of St. Andrew's, Holborn. Sacheverell, having no merit to keep him permanently before the public, now fell back into obscurity.

Sachs (zàks), HANS, the most distinguished meistersinger of Germany in the 16th century, born at Nuremberg in 1494, died in the same city 1576. He learned the trade of a shoemaker, and after the usual *wanderjahre*, or period of travelling from place to place, commenced business in his native city, married (1519), and prospered. An enthusiastic admirer of the Minnesingers, he took lessons under one of the chief meistersingers of Nuremberg, and to while away the tedium of the cobbler's art made verses himself. In this he soon surpassed all his contemporaries. Thousands of verses flowed from his fertile brain, crude, but full of imagery and humour. As a staunch follower of Luther, and an ardent advocate of his teachings, Sachs succeeded in imparting to his hymns a fervour which considerably aided the spread of the Reformation. A bronze statue to his memory was erected in 1874 at Nuremberg, where his house may still be seen.

Sachsen (zàk'sen), the German form of Saxony (which see).

Sachsen-Altenburg, Sachsen-Coburg-Gotha, &c. See *Saxe-Altenburg*, &c.

Sack (Spanish, *seco;* French, *sec*, 'dry'), formerly a general name for the different sorts of dry wine, more especially the Spanish, which were first extensively used in England in the 16th century.

Sackatoo. See *Sokoto.*

Sackbut. See *Sacbut.*

Sackville, THOMAS, Lord Buckhurst and Earl of Dorset, an English statesman and poet, son of Sir Richard Sackville of Buckhurst, born 1536, died 1608. At Oxford and Cambridge he distinguished himself by his Latin and English poetry, and as a student of the Inner Temple he wrote, in conjunction with Thomas Norton, the tragedy of Gorboduc, or Ferrex and Porrex (published in 1561), remarkable as the first example in English of regular tragedy in blank verse. The Mirror of Magistrates, and the Complaint of Henry, Duke of Buckingham, the introduction to an intended series of poems on the tragic lives of famous men, make one regret that he was induced to abandon literature for politics. He took a prominent and creditable part in some of the chief events of Elizabeth's reign. He was a member of the court which tried Mary Queen of Scots; he succeeded Lord Burleigh as lord-high-treasurer; and presided at the trial of the Earl of Essex. From 1587–88 he suffered imprisonment at the instigation of the queen's favourite Leicester. In 1566 he had succeeded to his father's ample estate; was raised to the peerage as Baron Buckhurst shortly afterwards; and James I. created him Earl of Dorset in 1604. He was buried at Westminster Abbey.

Saco, a river in the United States of America. It rises in New Hampshire, in the White Mountains, and runs south-east into the Atlantic below Saco, in Maine. It is 160 miles long, and has falls of 72 feet at Hiram, of 42 feet at Saco, and numerous minor ones.

Saco, a town in the United States, in York county, Maine, on the river of the same name, which supplies water-power to several factories, including woollen, cotton, and saw mills. Pop. 6075.

Sacrament, Latin, *sacramentum,* a pledge, an oath, in particular the military oath of allegiance. This word received a religious sense, in the Christian church, from its having been used in the Vulgate to translate the Greek *mystērion,* a mystery. Among the early Latin ecclesiastical writers *sacramentum,* therefore, signifies a mystery, a symbolical religious ceremony, and was most frequently applied by them to the rite of baptism. In modern Christian theology sacrament is defined as an outward and visible sign of an inward and spiritual grace, a solemn religious ceremony enjoined by Christ to be observed by his followers, and by which their special relation to him is created, or their obligations to him renewed and ratified. In early times the church had numerous sacraments, as many as thirty being enumerated in the first half of the 12th century. The Roman and Greek Churches now recognize seven sacraments: Baptism, Confirmation, the Eucharist, Penance, Extreme Unction, Orders, and Marriage. Protestants in general hold Baptism and the Eucharist to be the only sacraments. The Socinians regard the sacraments merely as solemn rites, having no divine efficacy, and not necessarily binding on Christians. The Quakers consider them as acts of the mind only, and have no outward ceremonies connected with them.

Sacramen'to, a river of the U. States, in California. It rises in the Sierra Nevada, on the borders of Oregon, and drains the central valley of California from the north. Its course is about 500 miles, 300 of which are navigable for small steamers. It discharges its waters into the Bay of San Francisco.

Sacramento, a town in the United States, capital of California, in the county and on the river of same name, 80 miles north-east of San Francisco. It occupies a low and level site, and vast sums of money have been spent for embankments, and in raising the street levels, so as to secure the town against inundation by the river. Sacramento owes its origin and prosperity to the northern gold-fields. It has suffered much from water and fire during its short existence, but is now a regular and well-built city, boasting of many good buildings. The state capitol, centrally situated in a large, well-laid-out park, is a grand structure, and cost about half a million sterling. Pop. 26,386.

Sacred Heart of Jesus, among Roman Catholics an object of special devotion, in which the physical heart of Jesus is regarded as a symbol of his charity and of his inner life, and connected with which is a festival celebrated on the Friday after the octave of Corpus Christi. This devotion was introduced in the latter part of the 17th century to perpetuate the visions of a nun at Paray-le-Monial, France, named Marguerite Marie Alacoque. It gradually spread, and has been more or less ardently cultivated ever since. Numerous convents and other religious institutions devoted to the Sacred Heart exist throughout the Ca-

tholic world, while pilgrimages to the shrine of Marie Alacoque (beatified in 1864) are organized on a large scale from time to time. A magnificent church dedicated to the Sacred Heart has been erected at Montmartre, Paris.

Sacrifices, gifts offered with some symbolic intent to the Deity, generally an immolated victim or an offering of any other kind laid on an altar or otherwise presented in the way of religious thanksgiving, atonement, or conciliation. The origin of sacrifice is a point much disputed; the two opposed views being that of a primeval appointment by the Deity, and that of a spontaneous origination in the instinctive desire of man to draw near to God. The symbolic character of sacrifice may be represented under three heads: (1) Propitiatory, or designed to conciliate generally the favour of the Deity; (2) Eucharistic, or symbolical of gratitude for favours received; (3) Expiatory, or offered in atonement for particular offences. To a different class may be assigned deprecatory sacrifices designed to avert the wrath or appease the wicked disposition of deities. The customs of the Jews regarding sacrifice are noteworthy on account of their very express and explicit claims to a divine origin, and because of their connection with the Christian religion. Details are amply given in the Book of Leviticus. Few religions, whether ancient or modern, have omitted sacrifices from among their rites. The ancestors of all the existing races in Europe practised human sacrifices, and similar usages widely prevailed throughout the world. Among Christians the Roman Catholic and Greek Churches regard the mass as a mysterious sacrifice; but with Protestants it is not generally so regarded.

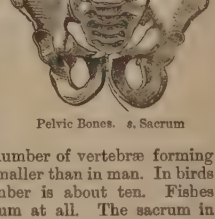
Sac'rilege, in a general sense, the violation or profaning of sacred things; more strictly the alienating to laymen, or common purposes, what was given to religious persons and pious uses. Church robbery, or the taking things out of a holy place, is sacrilege, and by the common law was punished with more severity than other thefts, but it is now put by statute on the same footing with burglary or housebreaking.

Sac'ristan, the same as *sexton*, which is corrupted from it, an officer in a church whose duty it is to take care of the church, the sacred vestments, utensils, &c.

Sac'risty, the apartment in or connected with a church intended for the keeping of the sacred vestments and utensils while not in use, and in which also the clergy and others who take part in religious ceremonies array themselves for so doing.

Sacrobosco, or JOHN HOLYWOOD, a mathematician and astronomer of the 13th or 14th century. He was a native of Britain, but lived chiefly in France, and died at Paris as professor of mathematics at the university.

Sa'crum, in anatomy, the bony structure which forms the basis or inferior extremity of the vertebral column. The human sacrum forms the back part of the pelvis, is roughly triangular in shape, consists of five united vertebræ, and from its solidity it is well adapted to serve as the keystone of the pelvic arch, being wedged in between and articulating with the haunch-bones. In most mammals the number of vertebræ forming the sacrum is smaller than in man. In birds the lowest number is about ten. Fishes possess no sacrum at all. The sacrum in man is fully ossified and completed in development from the twenty-fifth to the thirtieth year of life, but the component parts can generally be perceived even in the most aged individuals.



Pelvic Bones. *s*. Sacrum

Sacy (sà-sē), ANTOINE ISAAC, BARON SILVESTRE DE, French philologist, born in Paris 1758, died 1838. After acquiring a thorough knowledge of the Greek and Latin classics, he studied Hebrew, Syriac, Chaldee, Samaritan, Arabic, and Ethiopic; mastered the principal European languages, including Turkish, and later on also Persian; was appointed professor of Arabic in the School of Oriental Languages in 1795, and in 1806 professor of Persian at the College of France. In 1808 he was elected to the Corps Législatif. He was one of the most active members of the Asiatic Society and of the Academy of Inscriptions, and a prolific contributor to the learned Transactions of the period. Napoleon created him a baron in 1813, and under Louis Philippe he became a member of the chamber of peers in 1832. His teaching gave a powerful impetus to the study of Oriental languages in Europe.

Saddle, a kind of seat for a horse's back, contrived for the safety and comfort of the

rider. In early ages the rider sat on the bare back of his horse, but in course of time some kind of covering was placed over the back of the animal. Such coverings became afterwards more costly, and were sometimes richly decorated. The modern riding saddle consists of the tree, generally of beech, the seat, the skirts, and the flaps, of tanned pig's-skin, and the construction and weight vary according to the purposes for which it is to be used. Among the varieties are racing saddles, military saddles, hunting saddles, and side-saddles for ladies. The name saddle is also given to a part of the harness of an animal yoked to a vehicle, being generally a padded structure by means of which the shafts are directly or indirectly supported.

Sad'ducees, one of the two chief sects or parties existing among the Jews in the time of Christ. Various accounts are given of their origin. Some critics recognize in the Sadducees the descendants and adherents of the Zadok mentioned in 1 Kings i. 39. For the knowledge we possess about them we are indebted to the New Testament and to Josephus, a Pharisee, but comparatively little of their actual position is certainly known. They were a less numerous, but more aristocratic party than the Pharisees; they possessed the largest share of wealth, and, in consequence, generally held the highest dignities. A constant feud existed between the two sects. The Sadducees were distinguished for three special beliefs or doctrines: they repudiated the oral law, they denied the resurrection of the dead, and disbelieved in the existence of angels and spirits (or at least did not hold the current views regarding these). The Sadducees rapidly disappeared after the 1st century of the Christian era.

Sadi, or SAADI, the most celebrated didactic poet of Persia, born at Shiraz about the end of the 12th, died about the end of the 13th century. In his youth he visited Hindustan, Syria, Palestine, Abyssinia, and made several pilgrimages to Mecca and Medina. While in Syria he was taken by the Crusaders, and actually compelled to labour as a slave at the fortifications of Tripoli. After about fifty years of wandering he returned to his native city, delighting everybody with his poems and sage precepts. The best of his works are: Gulistan (Garden of Roses), a moral work, comprising stories, anecdotes, and observations and reflections in prose and verse; and Bostān (the Orchard), a collection of histories, fables, and moral instructions in verse.

Sadler, or SADLEIR, SIR RALPH, an English statesman, born 1507, died 1587. Thomas Cromwell, earl of Essex, in whose family he had been employed for some time, brought him under the notice of Henry VIII., and the king charged him with several important missions to Scotland, and created him a knight in 1543. As a staunch Protestant he relinquished public life during the reign of Mary, but on the accession of Elizabeth in 1558 he entered parliament, became a privy-councillor, and the queen employed him again in Scotland. During Queen Mary's imprisonment at Tutbury Sadler was for a time her keeper, and after her execution in 1587, and just about a month before his own death, he had to perform the duty of carrying Elizabeth's letter of condolence and apology to James VI. of Scotland.

Sa'dowa, a village on the Bistritz, in Bohemia, not far from Königgrätz. It is celebrated as the scene of the preliminary engagement, on July 3d, 1866, between the Austrians under Benedek and the Prussians under Prince Frederick Charles, which culminated in the decisive battle of Königgrätz. The whole conflict is also known as the battle of Sadowa.

Safe, a receptacle for valuables, of iron or steel, or both combined. A safe to answer all requirements should be fire, explosive, acid, drill, and wedge-proof. A fireproof safe need only be so constructed that, although exposed to the intense heat of a conflagration, its inner recesses remain at a sufficiently low temperature to prevent combustion of the contents. A burglar-proof safe needs many other safe-guards, and the history of safe-making is mainly a record of struggles between the safe manufacturer and the burglar; the result is that safes can now be obtained which are all but impregnable. The safe consists of an outer and an inner wall, the space between being filled with some fire-proof material such as asbestos, silicate cotton, gypsum, &c. The outside casing, which may be single or compound, naturally receives the greatest attention, and various are the devices of manufacturers to render it sufficiently hard and solid to resist the finely-tempered drills of the burglar. To prevent wrenching, the door is secured by bolts moving straight or diagonally into slots on one or on all sides. These bolts are moved by the door handle,

and the lock-key fixes them in their positions. With the modern safe of the best kind, the lock may be said to be the only vulnerable point, hence much care and ingenuity have been expended on its mechanism. The first great improvements in locks, as applied to safes, are due to Chubb of London, a name which still stands in the front ranks of safe-lock makers; but numerous patents, mostly of American origin, have in recent years been introduced. Of these the keyless permutation locks deserve particular mention, as they obviate the danger which arises from lost or false keys. Such locks allow of opening only after an indicator has been moved in accordance with a certain combination of numbers arranged before closing the safe. Some safe-locks are so constructed that to be freed they require different keys on different days, some can only be opened at a certain hour, this being fixed on before the door is closed; while others again require two or more keys in charge of different persons; in fact, the arrangements contrived to render the plundering of safes next to impossible are too numerous even to mention. The connection of safes with electric alarms in a variety of ways forms another safeguard.

Safe-conduct, a protection granted by authority to persons travelling in an enemy's or in a foreign country to secure them against molestation. These special safe-conducts have in modern times been mostly superseded by the passport system.

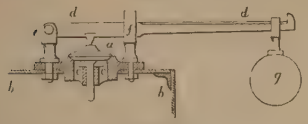
Safed Koh ('White Mountains'), a mountain range in Afghanistan. The westerly portion of the chain separates the Herat river valley from the Murghab, while the easterly Safed Koh forms the southern boundary of the Cabul basin. These mountains are quite alpine in their character, and some of the peaks exceed 15,000 feet in height. Among the spurs of the eastern section are the passes leading from Cabul to Jalalabad, and from Jalalabad to Peshawur famous in the annals of British military expeditions into Afghanistan.

Safety-lamp, a lamp for lighting coal-mines without exposing the miners to explosions of fire-damp. The first safety-lamp was invented by Sir Humphry Davy in 1816, and until a quite recent period his system, with some slight modifications, was in general use. It consists principally of a cistern to hold the oil, in the top of which the wick is placed. Over the cistern a cylinder of wire-gauze is fixed so as to envelop the flame. The lamp is closed by a bolt passing through both parts, and to prevent the miner from exposing the flame a locking arrangement exists. The diameter of the gauze wire is from $\frac{1}{40}$ to $\frac{1}{50}$ of an inch, and the apertures do not exceed the $\frac{1}{28}$ of an inch square. The Stephenson lamp, better known among miners as the 'Geordie,' has a glass chimney as well as the wire-gauze, and the air to feed the flame enters through a perforated ring just below the wick. This lamp, though safer than the Davy, if used with care, becomes a source of danger if the perforated ring is allowed to get clogged and the glass chimney overheated. A series of trials with safety-lamps, made in Britain by a committee of the Midland Institute, led to the condemnation of the ordinary Davy and Stephenson lamps, and to the introduction of the Mueseler, Marsant, and several other lamps, which had been used with satisfaction in Belgian and French mines. They are, however, all modifications of the principle which underlies the original invention of Sir Humphry Davy. A safety-lamp recently brought before the public is the Thornebury, which is said to be self-extinguishing in an explosive mixture of fire-damp and air, to give a strong light, to be simple in construction, and absolutely safe. There are also several electric miner's lamps in the market.

Safety-valve, a contrivance for relieving the pressure of steam before it becomes too great for the calculated strength of the containing vessel. The commonest form of safety-valve on steam-boilers is a lid (*valve*), pressed against a hole (*seat*) by either a spring or a weight; the spring or weight not exerting a greater force than can be overcome by the pressure of the steam inside, part of which then escapes and obviates any danger. The valve is round, is bevelled round the edge, and is furnished with a spindle which moves loosely in a guide attached to the seat; the seat is bevelled to fit the edge of the valve. On locomotive and on ships' boilers the valve is pressed against the seat by a spring arrangement; but on stationary boilers a weight should always be employed. Fig. 1 shows a safety-valve, in which a weight is employed. Here *a* is the valve, *b b* the boiler, *c c* the valve-seat, usually, like the valve itself, made of gun-metal, *d* the lever turning upon a fixed centre at *e*, and pressing upon the valve by a steel point, *f* a guide for the lever, *g* a weight which may be shifted backwards and forwards according

to the pressure desired. Fig. 2 shows a form of spring safety-valve, in which a series of bent springs *h h h* are placed alternately

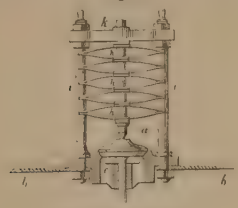
Fig. 1.



Lever Safety-valve.

in opposite directions, their extremities sliding upon the rods *i i*, and the springs being kept down by the cross-bar *k*; *a* being the

Fig. 2.



Spring Safety-valve.

valve, *c* the valve-seat, and *b b* part of the boiler.

Saffi, SAFIE, or AZFI, an ancient seaport in Morocco, on the west coast, at one time an emporium of the European trade with Morocco. The Portuguese held it from 1508–1641. Pop. about 10,000.

Safflower, or BASTARD SAFFRON (*Carthămus tinctorius*), a large thistle-like plant with orange-coloured flowers, natural order Compositæ. It is cultivated in China, India, Egypt, and in the south of Europe. An oil is expressed from the seeds, which is used as a lamp-oil. The dried flowers afford two colouring matters (also called safflower), a yellow and a red, the latter (carthamine) being that for which they are most valued. They are chiefly used for dyeing silk, affording various shades of pink, rose, crimson, and scarlet. Mixed with finely-powdered talc, safflower forms a common variety of rouge. In some places it is used in lieu of the more expensive saffron, and for adulterating the latter. The oil, in large doses, acts as a purgative.

Saffron (*Crocus sativus*, natural order Iridaceæ), a low ornamental plant with grass-like leaves and large crocus-like purple flowers, cultivated in the East and in Southern Europe for the sake of its stigmas. These when dried form the saffron of the shops, which has a deep-orange colour, a warm bitterish taste, and a sweetish penetrating odour. Its orange-red extract is used by painters and dyers, and the saffron itself also in cookery and confectionery as a colouring and flavouring substance. Bastard saffron is safflower; meadow saffron *Colchicum autumnāle*.

Saffron-Walden, a municipal borough, England, county of Essex, 38 miles N.N.E. of London. It is a place of great antiquity, and carries on a considerable trade in malt, grain, cattle, &c. Pop. 6104.

Sagan, a town in Prussia, province of Silesia, government Liegnitz, on the Bober. It was formerly the capital of the principality of Sagan, and has still a ducal castle with fine garden and park. Various manufactures are carried on, especially that of linen. Pop. 12,916.

Sagape'num, a fetid gum-resin brought from Persia and Alexandria, generally believed to be furnished by some species of the genus *Ferŭla*. It occurs either in tears or irregular masses of a dirty brownish colour, containing in the interior white or yellowish grains. It has an odour of garlic, and a hot, acrid, bitterish taste. It is occasionally used in medicine as a nervine and stimulating expectorant.

Sagas ('tales'), the name given to a class of prose epics among the Icelanders, of a mixed character, blending fiction with authentic narrative. Some detail particular events relating to politics or religion, some the history of a particular family, and others the lives of kings and other eminent individuals. The sagas have been much studied by modern writers and critics, and they have elucidated the mythology, history, and antiquities of the North to an eminent degree. Originally they were composed for oral recitation, and prior to the 12th century they lived only in the memories of the people, hence the varying versions of the same events. Between the 12th and 15th centuries numbers of these detached tales were collected, written down, amplified or curtailed, and worked into a series of consecutive narratives. The sagas of the west of the island are most elegant in style, and this circumstance is attributed to Celtic influence. Among the more important sagas are: the Saga of Gisli, the outlaw; that of the hero and poet Egill; the

Eyrbyggia Saga, a saga of very mixed contents; the Laxdœla Saga, the story of the Icelandic heroine Gudrun; the Saga of Grettir the Strong; the Saga of Nial, a complex saga of great legal and historical value. A number of the most interesting sagas are to be had in English translations.

Sage, the common name of plants of the genus *Salvia*, a very large genus of monopetalous exogenous plants, nat. order Labiatæ, containing about 450 species, widely dispersed through the temperate and warmer regions of the globe. They are herbs or shrubs of widely varying habit, usually with entire or cut leaves and various-coloured (rarely yellow) flowers. The best known is the *S. officinālis*, or garden sage. This plant is much used in cookery, and is supposed to assist the stomach in digesting fat and luscious foods. Sage-tea is commended as a stomachic and slight stimulant.

Sage-brush (*Artemisia Ludoviciana*), a low irregular shrub of the order Compositæ, growing in dry alkaline soils of the N. American plains. The name is also given to other American species of *Artemisia*.

Sage-cock. Same as *Cock-of-the-Plains.*

Saghalien, Saghalin (sah'a-lēn), a long island in the North Pacific, separated from Manchuria by the Gulf of Tartary, opposite the mouth of the Amoor; area, 24,560 square miles. The centre is mountainous. There are three parallel ridges running from north to south, from 2000 to 5000 feet above sea-level, and densely covered with conifers. Climate, flora, and fauna are almost Siberian. The inhabitants consist of Russians (many of them convicts), Japanese, Ainos, &c., altogether some 20,000. The island formerly belonged to the Chinese Empire, but early in this century the Japanese took possession. In 1875 the Russians obtained its cession from Japan.

Saginaw (sag-i-na'), a city of the U. States, capital of Saginaw county, Michigan, on both sides of the Saginaw River, here navigable for the largest lake craft, about 17 miles from Lake Huron. Saginaw is well supplied with railway connections; and there are numerous saw-mills and other industrial establishments. Pop. 46,322.

Sagitta (sa-jit'a), a genus of annelids, forming the order Chætognatha. This animal is a transparent marine form, straight and slender, attaining the length of about an inch. The head carries a series of setæ or bristles surrounding the mouth, and the hinder margin of the body is fringed with a sort of fin. The species are found living in the open sea all over the world.

Sagitta'ria. See *Arrow-head.*

Sagitta'rius (the Archer), in astronomy, the ninth sign of the zodiac, into which the sun enters November 22. The constellation consists of eight visible stars. It is represented on celestial globes and charts by the figure of a centaur in the act of shooting an arrow from his bow.

Sagit'tate, in botany, a term applied to the form of leaf shaped like the head of an arrow; triangular, hollowed at the base, with angles at the hinder part.

Sago, a starchy product obtained from the trunk of several species of a genus of palms named *Sagus*, and chiefly by *S. Rumphii* and *S. lævis.* The latter, from which the finest

Sago Palm (*Sagus lævis*).

sago is prepared, forms immense forests on nearly all the Moluccas, each stem yielding from 100 to 800 lbs. of sago. The tree is about 30 feet high, and from 18 to 22 inches in diameter. It is cut down at maturity, the medullary part extracted and reduced to powder like sawdust. The filaments are next separated by washing, and the meal laid to dry. For exportation the finest sago meal is mixed with water, and then rubbed into small grains of the size and form of coriander seeds. The Malays have a process for refining sago, and giving it a fine pearly lustre, the method of which is not known to Europeans; but there are strong reasons to believe that heat is employed, because the starch is partially transformed into gum. The sago so cured is in the highest estimation in all the European markets. Sago forms a light, wholesome, nutri-

tious food, and may be used to advantage in all cases where a farinaceous diet is required. It is also largely used in the manufacture of soluble cocoas, and for adulterating the common sorts of arrowroot. For Portland-sago see *Arum*.

Sa'goin, or SAGOUIN, the native South American name of a genus (*Callithrix*) of Brazilian monkeys of small size, and remarkably light, active, and graceful in their movements.

Sagor. See *Saugor*.

Saguenay (sag'e-nā), a river of Canada, prov. of Quebec, formed by two outlets of Lake St. John, which unite about 9 miles below the lake, from which point the river flows S.E., and falls into the St. Lawrence at Tadousac Harbour; length about 100 miles. For many miles of the latter part of its course the banks are very lofty, and in some parts there are precipices more than 1000 feet high. Ships moor at rings fixed into some of the precipitous walls of rock, the water being so deep as to be unsuitable for anchorage. The Saguenay is navigable for vessels of any size to Ha Ha Bay, a distance of about 50 miles to 60 miles from the St. Lawrence, and at high-water for vessels of large dimensions from 15 miles to 18 miles farther. It is visited by many tourists on account of its remarkable scenery.

Sagun'tum, formerly a town in Spain south of the Ebro, about 3 miles from the coast. It is famous in Roman history; its siege by Hannibal in 219–218 B.C. having given rise to the second Punic war. The site is occupied by the modern town of Murviedro.

Sahara (sa-hā'ra; properly sȧ'ha-rä), THE, that vast and mainly desert tract of Northern Africa lying north and south of the Tropic of Cancer, between the Atlantic and the Nile. In the north it extends to and forms part of Morocco, Algeria, Tunis, Tripoli, and Egypt; in the south it is chiefly bounded by the Soudan. This immense area, calculated at over 3½ million square miles, is not, as popularly supposed, a great level desert; on the contrary, it offers considerable variety of configuration and vegetation. The surface ranges from below sea-level to 8000 feet above it. There are the extensive and elevated plateaux of Tasili, Tibesti, &c., about the centre of the Sahara, running from the north in a south-easterly direction, and presenting some very high mountain masses. Between Tibesti and the Niger we have the elevated region of Air, and towards the Atlantic Adrar. These plateaux are intersected by many fertile valleys fit for agriculture and pasture. Other parts of the desert are broken by large oases with a most luxuriant vegetation, such as Twat, Wargla, and Fezzan. On the borders of Algeria oases have been created artificially by means of artesian wells. A vast tract of true desert, El Djuf, lies in the west-central region, and unites all the worst characters of the desert — want of water, intense heat, and moving sands. In the desert proper there is little of animal or of vegetable life. A few species of antelopes, the wild ass, the mountain sheep, the hyæna, the baboon, the tortoise, and the ostrich, are met with in favoured spots. Lizards, jerboas, and serpents of many kinds retain undisturbed possession of the burning sands. Where herbage exists it is mainly composed of such plants as require but little moisture. The vegetable wealth of the desert-dweller lies in the date-palm. The population, estimated at about 2½ millions, consists of various tribes of Arabs, Berbers, and negroes. The Berbers are almost confined to the west-central, and the negroes to the east-central parts, while the Arabs predominate in the other regions. Camel-breeding, slave and salt dealing, caravan conducting, and brigandage form the chief occupations of a large section. A number of caravan routes through the Sahara connect Timbuctoo and the Soudan with the maritime countries in the north. Recent explorations have finally disposed of the idea that the Sahara is the dried-up bed of a former inland sea, and that it could be restored to its former condition by admitting the waters of the ocean. The diluvial sea theory is now limited to the low-lying districts, El Djuf and Kufra, which abound in rock-salt deposits. Spain annexed in 1887 the coast between Morocco and Senegal, and by treaty with the Adrar sheiks secured considerable territory inland.

Sahárunpur (sa-hä-ran-pur'), a town in Hindustan, capital of the district of the same name, in the North-west Provinces. It has many handsome residences in the European style, a government stud, a botanic garden, and a large sugar and grain trade. Pop. 63,194.

Sahib, the usual term of address by natives of India towards a European gentleman.

Sai (sä'i), the name applied to the weeper-monkey of Brazil. See *Sapajou*.

Saiga (sī'ga; *Antilŏpe Saiga*), a species of antelope found on the steppes of Russia and on the Russian borders of Asia. It forms one of the two European species of antelopes; the other species being the chamois. The saiga is about 2½ feet in height, with spiral horns, tawny coloured in summer, light gray in winter.

Saigon (sī-gon'), capital of French Cochin-China, of which it is the chief trading emporium, on the right bank of the river of the same name, 35 miles from its mouth in the China Sea, one of the finest cities in the East. The bulk of the business is carried on in the suburb of Cholon. Saigon is connected by canal with the Me-kong, and by rail with Mytho, situated on one of the arms of that river. The Saigon river is navigable, even at ebb-tides, by the largest vessels up to the town, and an active trade with China,

Sails of a full-rigged Ship.

Siam, Singapore, Java, &c., is carried on, rice being the staple article of export. The population, including Cholon, is about 60,000.

Saikio. Same as *Kioto.*

Sail, a piece of cloth or tissue of some kind spread to the wind to impel or assist in impelling a vessel through the water. Sails are usually made of several breadths of canvas, sewed together with a double seam at the borders, and edged all round with a cord or cords called the *bolt-rope* or *bolt-ropes.* A sail extended by a yard hung by the middle is called a *square sail;* a sail set upon a gaff, boom, or stay, so as always to hang more or less in the direction of the vessel's length, is called a *fore-and-aft sail.* The upper part of every sail is the *head*, the lower part the *foot*, the sides in general are called *leeches.* The lower two corners of a square sail are in general called *clues*, and are kept extended by ropes called *sheets.* Sails generally take their names, partly at least, from the mast, yard, or stay upon which they are stretched; thus, the main-course, main-top sail, main-topgallant sail, are respectively the sails on the mainmast, main-topmast, and main-topgallant mast. The names of the sails shown in the above cut are: 1, flying jib; 2, jib; 3, fore-topmast staysail; 4, fore-course (or fore-sail); 5, fore-topsail; 6, fore-topgallant sail; 7, fore-royal; 8, fore-sky-sail; 9, fore-royal studding-sail; 10, fore-topgallant studding-sail; 11, fore-topmast studding-sail; 12, main-course (main-sail); 13, main-top sail; 14, main-topgallant sail; 15, main-royal; 16, main-sky-sail; 17, main-royal studding-sail; 18, main-topgallant studding-sail; 19, main-topmast studding-sail; 20, mizzen-course (cross-jack); 21, mizzen-top-sail; 22, mizzen-topgallant sail; 23, mizzen-royal; 24, mizzen-sky-sail; 25, spanker or driver. The vessel represented might, however, carry additional sails to those shown, in the shape of stay-

sails, &c.; and in modern ships the top sails and topgallant sails are often divided into lower and upper. Four-masted ships are now not uncommon. See *Ship*.

Sailcloth, a strong linen, cotton, or hempen cloth used in making sails. The best is made of flax, and combines flexibility with lightness and strength.

Sail-fish. See *Sword-fish*.

Sainfoin, a plant, *Onobrÿchis satīva*, natural order Leguminosæ, a native of Central and Southern Europe and part of Asia. It has been in cultivation for centuries for the purpose of supplying fodder for cattle either in the green state or converted into hay. It is a pretty plant with narrow pinnate leaves and long spikes of bright pink flowers; stem 1½–2 feet high. It grows best on chalky loams and gravelly soils on a calcareous bottom. Being hardy, it will produce crops where clover and rye-grass are grown with difficulty; and under favourable conditions may last from eight to twelve years.

Saint Albans, a municipal borough and cathedral city in Hertfordshire, England, 24 miles north-west of London. It stands close to the site of the ancient *Verulamium*, and owes its name to St. Alban, the protomartyr of Britain. St. Albans figures prominently in English history, and two battles were fought here (1455 and 1461) between the rival houses of York and Lancaster. The cathedral is a large and beautiful structure recently restored, and St. Michael's contains the remains of and a monument to Lord Bacon. Straw-plaiting and silk-throwing are the chief industries. By a readjustment of the dioceses of Rochester and Winchester, the see of St. Albans was created in 1877. St. Albans gives name to one of the parliamentary divisions of Hertfordshire. Pop. 12,895.

Saint-Amand-les-Eaux (san-tä-mänlā-zō), a town in France, department of Nord, on the Scarpe, 7 miles north-west of Valenciennes. It is famous for its hot sulphurous springs, and has manufactures of fine cotton yarns, &c. Pop. 8572.—There is another Saint-Amand—St. A.-Mont-Rond, in dep. Cher; pop. 7458.

Saint Andrews. See *Andrews (St.)*.

Saint Anthony's Fire. See *Erysipelas*.

Saint-Arnaud (san-tär-nō), Achille Le Roy de, French marshal, born 1801, died 1855. He entered the army in 1831, distinguished himself in Algiers by leading a successful expedition against the Kabyles in 1851, and was made general of division. Recalled to Paris the same year he was created minister of war by Louis Napoleon, and was the chief tool in the *coup d'état* of 2d December, receiving as reward the baton of a marshal. In 1854 he was commander of the French forces in the Crimea, but died from cholera a few days after the battle of Alma.

Saint Austell, a town in England, county of Cornwall, with a large trade in potters' clay, known as kaolin. In the vicinity are extensive tin and copper mines. St. Austell gives name to one of the parliamentary divisions of Cornwall. Pop. 3477.

Saint Bartholomew. See *Bartholomew*.

Saint Bees, a village in England, on the coast of Cumberland, with a theological institution, St. Bees College, established in 1816, for supplying an inexpensive theological training for the English Church. Pop. 1142.

Saint Catharine's, a town of Canada, prov. Ontario, 12 miles north-west of Niagara Falls, and near Lake Ontario. It is celebrated for its mineral springs (artesian), is the centre of a large and increasing trade, and contains flour and saw mills, foundries, &c. Pop. 9642.

Saint Catharine's College, Cambridge, was founded in 1473 by Robert Wodelarke, D.D., chancellor of the university and provost of King's College.

Saint Clair, a lake in North America, situated between Lake Huron and Lake Erie, and connected with the former by St. Clair River, with the latter by Detroit River. It is 30 miles long, greatest breadth 24 miles, area 360 square miles. It contains several fine islands. The river Saint Clair, which separates Canada and the United States, is about 40 miles long, 1 mile wide, and navigable.

Saint Cloud, Cyr, Denis, Dié, Dizier, Domingo. See *Cloud (St.)*, &c.

Sainte Augus'tine, a city and seaport in the United States, capital of St. John's county, Florida, on an inlet of the Atlantic, and a fashionable health resort during winter. It is said to be the oldest town in the United States, having been founded by the Spaniards about 1565. A few specimens of Spanish architecture remain, but these are rapidly making way for modern structures, and the town is putting on a new appearance. The Hotel Ponce de Leon is a monumental building in the early Spanish Renaissance style. It occupies a great extent of ground, and its architecture is rendered effective by distribution of plan, by lofty

towers, corner turrets, arcades, and low-pitched overhanging tiled roofs. It has also garden courts and ornamental gardens. There are also other large hotels and several fine churches. Permanent population about 4800. but in winter over 10,000.

Sainte-Beuve (sant-bœv), CHARLES AUGUSTIN, a French writer, and one of the greatest of modern critics, born at Boulogne 1804, died at Paris 1869. He studied medicine at Paris, but abandoned that science in favour of literature, his first work of importance being on the French literature of the 16th century. His contributions to the Revue des Deux Mondes on French authors and literature formed for a considerable period the chief attraction of that periodical. In 1837 he delivered some lectures in the School of Port Royal at Lausanne, and these laid the foundation of his elaborate work, Histoire du Port Royal (1840–60). In 1840 he was appointed conservator of the Mazarin Library, and in 1845 admitted a member of the French Academy. After 1848 he contributed a number of critiques to the Monday numbers of the Constitutionnel and then of the Moniteur (Causeries du Lundi, 15 vols.; Nouveaux Lundis, 13 vols.). In 1852 he was appointed professor of Latin poetry in the Collége de France, but his views in favour of Napoleon III. and imperialism rendered him unacceptable to a large section of the students, and he resigned; he also lectured for some years on French literature at the École Normale Supérieure. The cross of the Legion of Honour was bestowed on him in 1859, and the senatorship in 1865. Most of his critical writings have been republished in various editions. He also wrote three volumes of poetry (1829–37), under the *nom de plume* 'Joseph Delorme;' but these do not rank high, although his ideal of poetry was of the very highest.

Sainte Croix (sant krwä), a West Indian island belonging to Denmark, 40 miles S.S.E. of St. Thomas; area, 74 square miles. The western portion is hilly, but the soil almost throughout the island is productive. Sugar is the principal crop, which is, however, diminishing. The island was discovered by Columbus. Pop. 18,430.

Saint Elias, MOUNT, a mountain situated in the north-west of Canada, near the boundary between it and Alaska, about 25 miles from the Pacific. It rises 18,017 feet above the ocean, and being completely isolated serves as a very important landmark.

Sainte Marie. See *Nossi-Ibrahim.*

Sainte-Marie-Aux-Mines (sant-mä-rē-ō-mēn). See *Markirch.*

Saintes (sant), a town in W. France, department Charente-Inférieure, on the Charente. It has an old cathedral and interesting Roman remains. The manufactures are bombazine, earthenware, &c.; and the trade is in brandy, wool, and corn. Pop. 12,495.

Saint-Étienne. See *Étienne (St.).*

Saint Eustatius. See *Eustatius.*

Saint-Evremond (sant-āvr-mōn), CHARLES MARGUETEL DE SAINT-DENIS, SEIGNEUR DE, a French writer, born in 1613, died 1703. At sixteen he entered the army, took part in many of the campaigns of the period, and rose to the rank of field-marshal, but gained his chief laurels in the salon of Ninon de l'Enclos as a brilliant conversationist and a graceful wit. He was a staunch royalist, but, compromised by the disgrace of Fouquet, and afraid of Mazarin, he fled to England in 1661, and was welcomed and pensioned by Charles II. He was buried at Westminster Abbey. His satirical writings and his letters are of most interest. One of the former is his La Comédie des Académistes.

Saint Francis, a river of the U. States, forming part of the boundary between Arkansas and Missouri, and entering the Mississippi. At high-water it is navigable for about 150 miles; total length 450.

Saint Gall. See *Gall (St.).*

Saint Germain. See *Germain (St.).*

Saint Helena. See *Helena (St.).*

Saint Helens, a municipal and parliamentary borough in England, in Lancashire, 10 miles E.N.E. of Liverpool. Till a comparatively recent period an unimportant village it is now a prosperous town. It owes its rise to the extensive coal-beds in the vicinity, and the introduction of various branches of manufacture, more especially that of glass. There are also important copper, iron, lead, and chemical works, and potteries. St. Helens returns one member to the House of Commons. Pop. 71,288.

Saint Helier. See *Helier.*

Saint-Hilaire, GEOFFROY. See *Geoffroy St. Hilaire.*

Saint-Hyacinthe, a city of Canada, province of Quebec, on the Grand Trunk Railway and the Yamaska and Black rivers, 35 miles E.N.E. of Montreal. It is a thriving place, and contains a R. Catholic cathedral, seminary, bishop's palace, &c. Pop. 7016.

St. James's Gazette, a London daily evening review and record of news, indepen-

dently conservative in politics, and devoting considerable attention to social, literary, and scientific topics. Founded in 1880. A weekly edition appears under the title of St. James's Budget.

Saint John. See *Bolingbroke.*

Saint John, a city and port of Canada, province New Brunswick, capital of St. John county, at the mouth of the river of the same name, which here enters the Bay of Fundy. It is built on rocky and irregular ground, and presents on the whole an attractive appearance. A fire in 1877 destroyed a large part of the town, and handsome and substantial houses have generally taken the place of the former wooden structures. The streets are regular; there are several fine squares and elegant public buildings, including the custom-house, post-office, city hall, general hospital, lunatic asylum, and churches. The harbour is commodious, spacious, never freezes, and is well protected by batteries. St. John is connected with Carleton, on the opposite side of the river, by a suspension bridge and a cantilever railway bridge. With Portland, formerly a separate city, but now incorporated with St. John, there is communication by street cars. St. John is the great commercial emporium of New Brunswick, and has in particular a great trade in lumber. The fisheries are very important, and ship-building and a variety of other industries are briskly carried on. The city was founded by American loyalists in 1783, after the revolution. Pop. 39,179.

Saint John, a river partly belonging to the U. States, partly to Canada, the last 230 miles of its course being in New Brunswick; total length 550 miles. It is navigable for large steamers to Fredericton, a distance of 80 miles. About 225 miles up are the Grand Falls, 75 feet high. The city of St. John is at its mouth.

St. John, CHARLES WILLIAM GEORGE, naturalist and sportsman, born 1809, died 1856. About 1834 he settled down to his favourite pursuits in the North of Scotland, and published Wild Sports and Natural History of the Highlands (1846), Tour in Sutherland (1849), and Notes of Natural History and Sport in Morayshire (1863).

St. John, JAMES AUGUSTUS, English writer, born 1801, died 1875. In 1830 he published Journal of a Residence in Normandy; and a journey to Egypt produced Egypt and Mohammed Ali, Egypt and Nubia, and Isis, an Egyptian Pilgrimage. He was the author of a number of other miscellaneous works, including several novels. — His sons, BAYLE ST. JOHN (1822–59), resided for several years in the East, and published books on Egypt, Turkey, &c., and a biography of Montaigne. — HORACE ROSCOE ST. JOHN, born 1832, has written works on India, and PERCY BOLINGBROKE ST. JOHN, born 1821, died 1889, travelled widely in America, contributed fiction, notably Indian tales, to various periodicals, and is the author of over thirty novels.

Saint John, KNIGHTS OF. See *John (St.), Knights of.*

Saint John's, capital of Newfoundland, on Avalon Peninsula in the south-east. It is attractively situated at the inner end of an excellent and capacious harbour, and is protected by several strong batteries and forts. Great part of it consists of wooden houses. The chief buildings include the R. Catholic and Anglican cathedrals, house of assembly, government house, R. Catholic college, &c. St. John's commands almost the entire trade of the island. Cod and seal oils are produced and exported on a large scale. Other important export articles are: cured fish, seal-skins, and copper ores. Pop. 29,007.

St. John's Bread. See *Carob-tree.*

St. John's College, CAMBRIDGE, a college founded in its present form by Margaret, countess of Richmond and Derby, mother of King Henry VII., in 1511. The chapel (1869) is by Sir Gilbert Scott, and is a fine specimen of the early decorated style. Ascham, Ben Jonson, Bentley, Herrick, Prior, Rowland Hill, Wilberforce, Wordsworth, and Lord Palmerston, were members of the college.

St. John's College, OXFORD, a college founded in 1555 by Sir Thomas White, Knight, and alderman of London. It owes much of its splendour to subsequent benefactions. Archbishop Laud built the inner quadrangle, after a design by Inigo Jones, and furnished the library, one of the best in the university, with some of the most valuable books and all its manuscripts. His remains are buried within the college.

St. John's Wort (*Hypericum*), a genus of plants, order Hyperiaceæ. Numerous species (160) are to be found in various parts of the temperate zone, mostly as small showy shrubs. Yellow is the predominating colour of the flowers, which are five-petalled. The leaves and blossoms, when rubbed between the fingers, emit a strong resinous-

aromatic odour and have a bitter taste, due to a volatile oil, possessing astringent and tonic properties, and which held a prominent place in the old pharmacopœias. *H. perforātum*, to which formerly the name of St. John's wort was limited, has its leaves marked with pellucid dots, giving them a perforated appearance. *H. calycinum*, popularly called Aaron's-beard, is a shrubby plant with handsome flowers, often planted in shrubberies, &c. Its leaves are also dotted.

Saint Joseph, a highly prosperous city in the United States, capital of Buchanan county, Missouri, on the river Missouri, which is crossed by a fine iron railway bridge. It is noted for its colleges and schools, has a fine court-house, splendid opera-house, large central railroad depot, &c. It is the most commercial and populous town of Western Missouri, and an important railway centre. It has manufactures of railway carriages and wagons, furniture, engines and boilers, stoves, clothing, flour-mills, boot factories, &c. Pop. 52,324.

Saint-Just (saṇ-zhûst), ANTOINE LOUIS LÉON FLORELLE DE, one of the most prominent men in the French revolution, born 1767, executed 1794. He adopted with enthusiasm the principles of the revolution, became the right hand of Robespierre, and one of the most energetic and resolute members of the Mountain party. He was an effective speaker, but unscrupulous and uncompromising. The guillotine was his general answer to all arguments and actions which did not harmonize with his own. He fell with Robespierre through the events of the 9th Thermidor (July 27, 1794; see *France—History*), and perished on the same scaffold with him on the following day.

Saint Kitt's. See *Christopher's* (*St.*).

Saint Lawrence. See *Lawrence* (*St.*).

St. Leger Stakes (sel'in-jér), a race for three-year-old colts or fillies, second in importance only to the Derby, run at Doncaster during the September meeting. The race is named from Lieut.-gen. St. Leger, who originated it in 1776.

Saint Lô. See *Lô* (*St.*).

Saint Louis (saṇ-lô'i), a town in Western Africa, capital of the French possessions in Senegambia, on an island of the same name at the mouth of the Senegal. St. Louis is the trade centre of Senegal. Pop. 18,924.

Saint Louis (lų'i or lų'is), a city of the United States, state of Missouri, capital of county of the same name, and commercial metropolis of the central Mississippi valley, on the right bank of the Mississippi, 20 miles below the mouth of the Missouri, and 1200 miles by river from New Orleans. It is regularly built and has an area, including suburbs, of 60 sq. miles. Among the public buildings are the custom-house and post-office, the merchants' exchange, the courts, the Washington and St. Louis Universities, numerous schools, churches, two large libraries, several theatres, &c. The public squares and parks cover an area of 2300 acres. In addition to its water communications St. Louis is one of the most important railway centres in the United States. It is connected with East St. Louis on the Illinois side of the river by two great bridges. The earlier, opened in 1874, at a cost of £2,000,000, consists of three arches of cast steel resting on stone piers. The centre span is 520 feet, the side ones each 500 feet; the rise of the arches being 60 feet. It is built in two stories, the lower one containing a double line of rails, the upper being for ordinary carriage and passenger traffic. Among the chief articles of trade are cotton, cereals, bacon, sugar, tobacco, wool, cattle, lumber. The industries embrace flour, packed meats, machinery, agricultural implements, glass, beer, &c. Coal is abundantly found in the vicinity. St. Louis was founded as a trading port by the French in 1764. In 1840 its pop. was 16,469; in 1890, including East St. Louis (15,000), 466,989.

St. Lucia. See *Lucia* (*St.*).

St. Malo. See *Malo* (*St.*).

Saint Mary's River, the channel connecting Lake Superior with Lake Huron, having more the character of a lake than a river. At Sault St. Marie, or St Mary's Falls, there is a fall of 18 feet, and to enable vessels to avoid this canals have been made both in the U. States and in Canada.

Saint Maurice, a river of Canada, prov. Quebec, which enters the St. Lawrence at Three Rivers after a course of about 300 miles through fine scenery and extensive forests. About 22 miles above its mouth are fine falls 160 feet high.

St. Michael. See *Azores*.

St. Michael's Mount, a remarkable conical rock on the south-west coast of England, county of Cornwall, on the north-west side of Mount's Bay, height 250 feet, connected with the mainland by an isthmus, which is dry at low water. On its summit are the remains of a monastery, founded by Edward the Confessor.

Saint-Michel (saṇ-mi-shel), Mont, a fortified rocky height in the department of La Manche, France, in Cancale Bay, 7 miles south-west of Avranches. On its summit are a castle, and an interesting church of the 10th century. There is a straggling village on the hill, with a population of about 300. It forms altogether an extremely picturesque mass, and can be approached across the sands at low water.

Saint Nazaire, a seaport of France, dep. Loire-Inférieure, at the mouth of the Loire, about 32 miles from Nantes, of which it is the out-port. Since 1850 the construction of docks, &c., has transformed it into an important shipping centre, with ship-building yards, iron-works, &c. Pop. 30,935.

St. Neots, an old market-town of Huntingdonshire, England, on the Ouse, with a fine church. Pop. 4077.

Saint-Nicolas, a town of Belgium, province of East Flanders, 19 miles E.N.E. of Ghent. It is substantially built, and one of the most thriving towns of Belgium. The manufactures are important, especially in cottons, woollens, and linens. Its fairs are much frequented. Pop. 25,914.

Saint-Omer. See *Omer* (*St.*).

Saintonge, formerly a province in the west of France, bounded by the Atlantic, Poitou, Guienne, and Angoumois. It belonged to the English from the time of Henry II. until it was conquered by Charles V. It is chiefly comprised in the department Charente-Inférieure.

Saint Paul, a city, United States, capital of Minnesota and Ramsey county, on the Mississippi, 10 miles below the Falls of St. Anthony. Owing to its favourable position it has grown in about 40 years from an insignificant depot into a fine city, and a great commercial and manufacturing centre. It is surrounded by a complete net of railways, and its situation on the Mississippi offers water communication of exceptional value. Manufactures include agricultural machinery, joinery, railway rolling-stock, flour, leather, boots, and preserved provisions. There are a medical and other colleges. Pop. 133,156.

St. Paul de Loanda. See *Loanda.*

St. Petersburg. See *Petersburg* (*St.*).

St. Peter's Port, or St. Pierre le Port, capital of Guernsey, on the east coast of the island. It has a walled sea-front forming a pleasant promenade, and a good modern harbour, consisting of two massive piers and a breakwater. St. Peter's Port is much frequented as a health resort, and trades chiefly in fruit, vegetables, and fish. Pop. 17,645.

Saint-Pierre. See *Pierre* (*St.*).

Saint-Pierre (saṇ-pi-ār), Jacques Henri Bernardin de, a French author, born 1737, died 1814. He learned engineering, and in the capacity of engineer worked in Malta, Russia, Germany, and for about three years for the French government in Mauritius. Having returned to France he betook himself to literature. His Études de la Nature, published in 1783, first secured him a literary position. Then followed his chief works: Paul et Virginie (1787) and Chaumière Indienne (1790), both of them (especially the former) very popular. He was married twice when well advanced in years, each time to a young girl. In 1795 he was admitted to the Institute.

Saint-Quentin. See *Quentin* (*St.*).

Saints, a word used in the New Testament as a general term to designate all believers in the gospel of Jesus Christ. In a specific sense it signifies persons whose lives have been deemed so eminently pious that the Greek and Roman Catholic Churches have authorized practices of commemoration and invocation in regard to them. The points involved in the R. Catholic doctrine are the intercession of the saints and the utility of invoking them. According to the Council of Trent 'the saints reigning with Christ offer their prayers for men to God;' and it teaches that 'it is good and useful to call upon them with supplication, and in order to obtain benefits from God through Jesus Christ, who alone is our Redeemer and Saviour, to have recourse to their prayers, help, and aid.' This help and aid is not expected to be given directly, but only through the favour the saints have with God, and through their intercession. As to how the saints are enabled to hear prayers addressed to them, there is no definite teaching. It is chiefly holy men who have died since the time of Christ that are spoken of as saints. The doctrine of saints, and the ideas and usages which grew out of them, form one of the main points of difference between the Protestants and the adherents of the abovementioned churches. The R. Catholics regard their beliefs on the subject of saints as supported by different parts of the Bible and the writings of many of the early fathers. Protestants generally object to the whole doctrine, alleging that not only is the idea of saints as intercessors nowhere contained in

the Bible, but that it originated centuries after the establishment of Christianity; and that it is against the chief doctrine of Christianity, which declares all men to be sinners, and to be saved only by Christ. Countries, cities, arts, trades, orders, things, &c., have their *patron saints*, or saints who are supposed to be specially interested on their behalf; but the church, it seems, determines nothing in relation to them. St. Denis is the patron of France; St. George of England and Russia; St. Andrew of Scotland; St. Patrick of Ireland; Olaff of Norway; Canute of Denmark; Nepomuk of Bohemia; Cecilia of music; Hubert of hunting; Crispin of shoemakers, &c. See *Beatification, Canonization, Relics.*

Saints' Days are days set apart by traditional usage or authority of the church for anniversary celebrations in honour of particular saints. They were first instituted in honour of martyrs. See *Festivals.*

Saint-Servan, a seaport town of Northwestern France, department of Ille-et-Vilaine, at the mouth of the Rance, near St. Malo. It is well built, has a good harbour and docks, and is a favourite sea-side resort. Pop. 12,867.

Saint-Simon (saṇ-sē-mōṇ), CLAUDE HENRI, COMTE DE, founder of a philosophico-religious sect of socialists, was born at Paris in 1760. At the age of eighteen he entered the army, served in the closing campaigns of the American war, was made prisoner in the naval combat in which the French were defeated by Rodney, and remained as such at Jamaica till the peace in 1783, after which he returned to France and abandoned the army. He went to Holland in 1785, and to Spain in 1787 in connection with canal projects. He took no active part in the revolution, which, indeed, caused him the loss of his own property; but he speculated in the national domains created by the confiscation of the landed property of the nobility and clergy, and thus by 1797 had realized a considerable fortune. He had by this time, it is said, conceived the idea of regenerating humanity, and in order to qualify himself for this great task he engaged in extensive studies, and travelled in England and Germany. He married in 1801, and in the course of a year ran through his fortune. After this he parted from his wife, and henceforth he lived in almost constant penury. During the ten years 1803–13 he wrote a number of works on scientific and political subjects, in which may be traced the gradual development of his socialistic theories, which found more definite expression in his subsequent and more important writings, such as L'Industrie ou Discussions Politiques, Morales et Philosophiques (1817–18), and Parabole (1819). Augustin Thierry, Saint Aubin, and Auguste Comte, who had become his disciples, collaborated in these later volumes. Finding the difficulty of procuring the means of subsistence and of publishing his works increasing, he attempted suicide by shooting (1823), but recovered with a mutilated visage and the loss of an eye. He lived for about two years after this, dying in 1825. Previously Comte had separated himself from St.-Simon on account of the theological element which the latter grafted upon his socialistic doctrines, a change which led to the production of the Catéchisme Industriel (1824), and Le Nouveau Christianisme (1825). Christianity he now averred to be a progressive system, and taking its fundamental principle of love he held the church to be a complete organization of society for ministering to the wants of the whole, and especially of the more numerous and poorer classes. A social hierarchy based on capacities and services, with authority to divide heritages, distribute salaries, regulate vocations, and take all necessary means for making the labour of all contribute to the common good, was deduced from these premises by his disciples, who for a time formed a somewhat prominent sect. Society was divided by the St. Simonian doctrine into three classes, priests, savants, and labourers, and was to be governed by the chiefs of the three classes. Capacity was to be the ground of distribution of functions. All property was to become on the death of the proprietor the property of the church or society. All children were to receive a general education till their particular capacities became manifest. For a few years after the death of its founder, St. Simonism was chiefly under the leadership of Bazard and Enfantin, but in 1832 the society was suppressed by the government. The sect came again into temporary activity during the revolutions of 1848 and 1871, and its members, mostly resident in Paris, are still publishing new editions of the works of St. Simon, Enfantin, and other leading spirits of this school.

Saint-Simon, LOUIS DE ROUVROY, DUKE DE, French writer, born 1675, died 1755. He was brought up on terms of intimate friendship with the Duke of Orleans, and when

the latter became regent he was appointed a member of the regency council. From 1692–1702 St. Simon served in the army. He possessed the esteem and to some extent the confidence of Louis XIV., and of the Duke of Orleans, but his spirit of independence, severe morality, and peculiar views about the mission of the aristocracy, made him unpopular at the court. Nevertheless he succeeded in getting himself well informed about all the court cabals, and the doings and sayings of almost every notable personage of the France of the period. This information he deposited in his Mémoires, published posthumously, and which have made him famous. The first satisfactory edition appeared in 1856–58 (20 vols).

Saint-Simonians. See *Saint-Simon*.

St. Thomas, or S. Thomé, a West African island, in the Gulf of Guinea, belonging to Portugal. Area, 355 sq. m., pop. 18,266; capital same name on the N.E. coast. There is a lofty mountain in its centre, culminating in St. Thomas' Peak, over 6000 feet high. Coffee plantations have taken the place of the former sugar plantations; and cocoa, vanilla, and cinchona are raised in increasing quantities. The climate is unhealthy for Europeans.

St. Thomas, a West Indian island, belonging to Denmark, one of the Virgin group, 36 miles E. of Porto Rico. Area, 33 sq. miles; pop. 14,389; capital, Charlotte Amalia, on the south side of the island, with a safe and commodious harbour, dock, fort, &c. It is neither fertile nor healthy, and is subject to droughts, cyclones, and earthquakes, but used to be an important centre of West Indian trade.

St. Thomas, a thriving town of Canada, prov. Ontario, 9 miles N. of Lake Erie, and 15 S. of London, with various industries and an active trade. Pop. 10,370.

St. Thomas, Christians of. See *Christians of St. Thomas*.

St. Vincent, a British West Indian island, in the centre of the Windward group. Area, 132 sq. miles; pop. about 41,000; capital, Kingstown, on a bay of the same name near the S.W. extremity of the island, with a pop. of 5593. The centre is mountainous (highest peak about 4000 feet), the soil in the valleys very fertile, and especially adapted for sugar cultivation. The climate is humid, yet healthy, and considered one of the finest in the West Indian islands. In the N.W. is an active volcano, called the Souffrière, about 3000 feet high, with an immense crater; an eruption in 1872 caused great damage in the island. Chief exports, sugar and arrowroot. St. Vincent was discovered by Columbus in 1498, and first became a British colony in 1763; between 1779 and 1783 it was held by the French.

St. Vincent, Cape, a promontory forming the S.W. extremity of Portugal. It is celebrated in naval history for the great victory gained here in 1797 by the British admiral Sir John Jervis over a Spanish fleet nearly twice the strength of his own. Sir John was raised to the peerage under the title Earl of St. Vincent.

St. Vitus's Dance. See *Vitus (St.)*.

Sais, a ruined city of Egypt, near the right bank of the Rosetta branch of the Nile, 67 miles north-west of Cairo, formerly a place of great importance.

Sakha'ra, a village of Egypt, where is the necropolis of ancient Memphis. It is remarkable for its ancient monuments, pyramids, &c.

Saki, the common name of several species of monkeys inhabiting South America, closely allied to the sapajous (which see),

Saki Cuxio (*Pithecia satanas*).

but differing from the latter in having non-prehensile tails. They are roughly subdivided into long and short-tailed sakis. They are all forest-dwellers, gregarious, nocturnal, timid, and live chiefly on honey and fruits.

Sâl (säl), one of the most valuable timber trees of India, *Shorĕa robusta*, nat. order Dipteraceæ, growing to the height of 100 feet. Extensive forests of it exist in northern India, where it is largely used in carpentry of all kinds, the wood being light brown in colour, hard, and uniform in texture. It yields a whitish, aromatic, transparent resin (sometimes called dammar), used to caulk boats and ships, and also for

incense. The sâl forests are now protected by government.

Sala, George Augustus, a journalist and author, born in London 1828. His father was an Italian, and his mother an actress and singer of West Indian extraction. He studied for art, but early embraced literature. Under Charles Dickens he became a contributor to Household Words. Subsequently he assisted in founding Temple Bar, of which he was editor, and he was a voluminous contributor to the newspaper press, often as special correspondent. The Seven Sons of Mammon, and Captain Dangerous, are novels that appeared in Temple Bar. He travelled over great part of the world, knew the great capital cities by heart, and was an eye-witness of some of the most important public ceremonials during more than the past quarter of a century. The experiences of his travels, and the sights seen, he described in a style peculiarly his own. His last work was his own Life and Adventures. Much of his work was contributed to the (London) Daily Telegraph, but All the Year Round, the Cornhill Magazine, and the Illustrated London News ('Echoes of the Week') contain many sparkling productions from his pen. He died in 1895.

Salaam (*sa-läm'*; Arabic, *seldm;* 'peace be with you'), the common salutation among Mohammedans.

Sal'ad (French, *salade,* from Latin, *sal,* 'salt'), a preparation of raw vegetables or herbs, such as lettuce, endive, red or white cabbages, celery, cresses, radishes, shalots, onions, green mustard, dandelion, corn-salad, &c.; or of cooked beet-root, potatoes, French beans, &c., with salt, vinegar, oil, sauces, and spices. A great number of salads may be made by suitable combination of the materials mentioned, and still further variety is obtained by the admixture of different kinds of shredded meat, fish, eggs, sausage, lobster, crabs, prawns, shrimps, sardines, &c.

Sal'adin, or properly Salah-ed-din, a celebrated sultan of Egypt and Syria, born 1137, died 1193. His father, a native of Kurdistan, was governor of Tekrit (on the Tigris). He early distinguished himself as a soldier, became vizier to the last of the Fatimite caliphs in succession to his uncle Shirkuh, and on the caliph's death in Egypt (1171) Saladin usurped his wealth and authority, with the approval of Nureddin, the sultan of Damascus. After the latter's death (1173), Saladin succeeded also in possessing himself of Damascus and Southern Syria. He rapidly extended his conquests over Syria and the neighbouring countries, and thus came in contact with the Crusaders during the Third Crusade. The disastrous defeat he suffered from the Crusaders in 1177 compelled him to return to Egypt, but in 1182 he resumed his career of conquest. In 1187 he gained the famous victory of Tiberias, and Jerusalem surrendered to him after a gallant resistance. But the fall of Acre in 1191 after a two years' siege, and the defeats at the hand of Richard I., compelled Saladin to conclude a truce (1192), which was followed by the withdrawal of Richard. About a year after this event Saladin died at Damascus. He was a skilful, brave, and magnanimous general; and an astute, beneficent, and merciful ruler. Saladin was the founder of the dynasty of the Ayoubites. See *Crusades.*

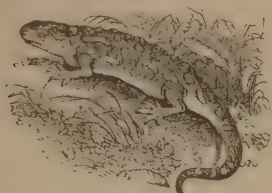
Sala'do, a river of the Argentine Republic, which rises on the eastern slopes of the Cordilleras, and falls into the Paraná after a course of 750 miles.

Sal Aëra'tus, Salera'tus, an American name for a baking-powder, prepared from carbonate (or bicarbonate) of soda and salt.

Salaman'ca, a city in Spain, capital of a province of the same name, 120 miles north-west of Madrid, on and between three hills, and on the river Tormes, here spanned by a fine bridge of twenty-six arches, the greater part of which is of Roman origin. In picturesqueness, and in the magnificence of its ancient edifices, Salamanca is hardly surpassed by any other Spanish city. Chief among the numerous attractions rank the cathedral (16th century), a splendid example of florid Gothic; the old cathedral, erected 1102, in Romanesque style; the university, the College of the Jesuits, King's College, and churches. The university is one of the oldest and most celebrated in Europe, and when at its zenith in the 16th century attracted some 15,000 students from all parts of Europe. Besides a number of interesting monastic buildings, there are also some large and elegant palaces and private mansions. The Plaza Mayor is a magnificent square. *Salmantica,* the ancient Salamanca, was taken by Hannibal in 222 B.C., and under the Romans it became a military station. It has been the theatre of many interesting historic events, but in modern times it is chiefly celebrated for the victory gained in its vicinity on the 22d July, 1812, by the Anglo-Portuguese army under the Duke of Wellington, over

the French under Marshal Marmont. Pop. 17,155.—The province of SALAMANCA, chiefly formed by the Douro basin, has an area of 4940 sq. miles, and a population of 311,428. It is rich in oak and chestnut forests and cereals, and produces wine, oil, and hemp.

Salaman'der, the name given to various animals included in the class Amphibia (frogs, toads, newts, &c.), and in the order Urodela ('tailed') of that class. The salamanders may be divided into the land salamanders (genus *Salamandra*) and the water



Common Salamander (*Salamandra vulgāris*).

salamanders, efts or newts. The land salamanders have an elongated lizard-like form, four feet, and a long tail. The skin is warty, with many glands secreting a watery fluid, which the animal exudes when alarmed. As this fluid is injurious to small animals the salamanders have the reputation of extreme venomousness, though they are in reality entirely harmless. The best-known species is the *Salamandra vulgāris*, the common salamander of Europe. It is 6 to 8 inches long, is found in moist places under stones or the roots of trees, near the borders of springs, in deep woods, &c., and passes its life in concealment except at night or during rain. It is sometimes called the *spotted salamander*, from the bright yellow stripes on its sides. There are various other species in Europe, Asia, and America. In America the name is often given to the menopome (*Menopoma alleganiense*). Salamanders feed on worms, slugs, snails, and insects. The old legend that salamanders could live in the midst of fire is, like their venomousness, a fiction, although it is possible that the watery secretion of the skin might enable these animals to resist heat with impunity for a longer period than other forms.

Sal'amis, or KOLURI, an island of Greece, in the Gulf of Ægina, close to the shore of Attica. It has a rocky surface, with a thin but not unproductive soil, and in some parts is well adapted for the olive and vine. The celebrated battle, B.C. 480, in which the vast and unwieldy Persian fleet under Xerxes was signally defeated by a much smaller Grecian fleet, was fought here.

Sal-ammoniac, the chloride of ammonium, now generally obtained from the refuse of gas-works. It is used in calico-printing, in galvanizing iron, in soldering, &c. See *Ammonia*.

Salan'gane, a species of swift (*Collocalia fuciphaga*) common throughout the Eastern Archipelago, and famous as the producers of the 'edible bird's nests.' See *Bird's Nests, Edible*.

Salawatty, an island off the western extremity of New Guinea, to the Dutch portion of which it is regarded as belonging; area about 750 sq. miles. Pop. 5000.

Saldanha Bay (sal-dan'ya), a bay of the Atlantic, on the west coast of Cape Colony, South Africa, 80 miles N. of Cape Town. It forms a fine natural harbour, with excellent shelter and anchorage at all seasons, but is at present little frequented on account of scarcity of water and fuel.

Sale, GEORGE, oriental scholar, was born in 1680, died 1736. He was a lawyer by profession, and a contributor to several important publications; but he is best known by his translation of the Koran, which appeared in 1734.

Sale, SIR ROBERT HENRY, British major-general, born 1782, died 1846. He entered the army at a very early age, and his brilliant military career supplies some stirring pages in the history of the British Indian Empire of the first half of this century. In India, Burmah, Afghanistan, wherever he was employed, he distinguished himself, especially in Afghanistan, where he forced Dost Mohammed Khan to surrender, and inflicted a crushing defeat upon Akbar Khan at Jelalabad (1842), after he had been besieged for several months, subsequently assisting in the recapture of Cabul. He died from a wound received at the battle of Moodkee (December 1845).

Salem. See *Jerusalem*.

Salem, a city and seaport of the United States, Essex county, Massachusetts, about 14 miles N.N.E. of Boston. Its site is formed by two inlets of the sea; the North River, connected with Beverley by a bridge nearly 1500 feet long, and the South River, which forms the harbour. Salem formerly had a considerable foreign trade, especially with the East Indies and China, and has still a large coasting trade, while its manufactur-

ing industries are in a flourishing condition, particularly in cotton, jute, leather and boots, spirits and chemicals. Salem has many interesting buildings, and played a prominent part in the earlier history of the States, being one of the oldest towns of the Union, founded in 1626. Pop. 30,801.

Salem, a district and town of Hindustan, Madras Presidency. Area of district, 7653 square miles; pop. 1,962,591. It consists partly of a tract below the Ghâts, but chiefly of a fine table-land rising in many parts to between 5000 and 6000 feet above the sea, well cultivated, with a cool and bracing air, and hence much frequented by Europeans. —SALEM, the capital, is well situated in a long narrow valley traversed by the Tirumanimuttar, is clean and tolerably well built, and has a good trade and a weaving industry of some importance. Pop. 67,710.

Salep is obtained from the tuberous roots of several species of orchis, especially *O. mascŭla*, and the finest is obtained from Asia Minor. It occurs in commerce in small oval balls of a whitish-yellow colour, of a horny aspect, hard, with a faint peculiar smell, and a somewhat insipid taste. It is much valued in the East for its supposed general stimulant and nutritious properties. For use it is ground into a fine powder, and mixed with boiling water, sugar and milk being added according to taste. It is to some extent used in Europe as a food for weakly persons.

Salera'tus. See *Sal Aëratus.*

Saler'no (anciently *Salernum*), a town and seaport of Italy, capital of the province of the same name, on the Gulf of Salerno, 30 miles south-east of Naples, finely situated on the side and at the foot of a hill, crowned by the remains of an ancient Norman citadel. It has an excellent marine promenade, and a cathedral dating from the 11th century. Its university (established 1150, abolished 1817) was famous in the middle ages, especially in medicine. Its well-sheltered port has recently been much improved. It was a place of great importance under the Romans, Goths, Lombards, and Normans. Silk and cotton are manufactured. Pop. 22,328.—The province has an area of 2126 square miles, and a pop. of 583,838.

Sales, SAINT FRANÇOIS DE, Bishop of Geneva, was born of noble parents at the castle of Sales, near Annecy, in Savoy, 1567; died 1622. He received his higher education at a Jesuit college in Paris, and finally devoted some years to the study of jurisprudence at Padua. Early in life he showed a decided predilection for the clerical life, and, against his father's desire, took orders in 1593. Geneva became the scene of his ecclesiastical work, and here, as dean, coadjutor bishop (1598), and bishop (1603), he spent the best part of his life. His eloquent, yet simple and persuasive sermons, and his exemplary life, exercised a powerful influence for the benefit of his church. His writings were much valued, and some of them have been translated into all the leading languages of Europe. The best known is his Introduction to a Religious Life. In 1665 he was canonized by Pope Alexander VII.

Salesian Nuns, the nuns of the order of the Visitation of the Virgin Mary, founded by François de Sales (see above), and his friend Madame de Chantal, one of his disciples, in 1610, at Annecy, in Savoy, as a refuge for widows and sick females. In the 18th century there were 160 convents and 6600 nuns of this order. There are still Salesian nuns in the principal cities of Italy, devoting themselves to the healing of the sick and the education of young girls.

Saley'er Islands, a group of islands in the Indian Ocean, south of Celebes, from which Great Saleyer is separated by the Saleyer Strait. They are about thirty in number; have a pop. of about 50,000 Mohammedan Malays governed by native rajahs under a Netherlands agent. Ebony, teak, indigo, coffee, earth-fruits, and cotton, are among the products.

Salford, a municipal and parliamentary borough of England, in Lancashire, which may be considered an integral portion of Manchester, though it has a mayor and corporation of its own, and a distinct parliamentary constituency returning three members. Among its buildings may be mentioned the law courts and the railway station. It became a parl. bor. in 1832, a mun. bor. in 1844. Pop. 198,136. See *Manchester.*

Sa'lians, or SALIAN FRANKS, is the name given to that section of the Franks who from the 3d to the middle of the 4th century were settled on the left bank of the Lower Rhine. Their origin is uncertain, but we know that the earliest Frankish kings were Salian Franks.

Salica'ceæ, a natural order of apetalous exogens, distinguished by a two-valved capsule, and numerous seeds tufted with long hairs. The species are trees or shrubs, inhabiting woods in the northern districts of

Europe, Asia, and America. Only two genera are included in the order, *Salix* or willow, and *Populus* or poplar.

Sal'icine, a bitter crystalline substance obtained from the bark of willows, and used in medicine, especially in the treatment of rheumatic fever, also in neuralgia and neuralgic headaches.

Salic Law, the code of laws of the Salian Franks. One of the laws in this code excluded women from inheriting certain lands, probably because certain military duties were connected with the holding of those lands. In the 14th century females were excluded from the throne of France by the application of this law to the succession to the crown, and it is in this sense that the term *salic law* is commonly used.

Salicyl'ic Acid, an organic acid of a sweetish-sour taste, without smell, possessing great antiseptic and anti-putrefactive properties. It occurs in nature in the flowers of the meadow-sweet, and in the whortle-berry; but that preferred by the medical profession is procured from the oil of the winter-green (*Gaultheria procumbens*). There are now several processes for manufacturing salicylic acid on a large scale, and it forms an important article of commerce. It is largely employed in medicine, having properties similar to those of quinine, and is given in acute and chronic rheumatism, used as a lotion in irritation of the skin, &c. A salt prepared from it, salicylate of sodium, is often preferred. Its use as a preservative of food or drink has been made a criminal offence by recent legislation in several European countries.

Salins (sá-lan; ancient, *Salinæ*), a town of France, department of the Jura. It owes its name to saline springs which were worked by the Romans, and still form the chief wealth of the town. Pop. 6419.

Salisbury (salz'be-ri), or NEW SARUM, an ancient city, municipal and parliamentary borough of England, capital of the county of Wilts, 80 miles south-west by west of London, at the junction of the Upper Avon with the united streams of the Willey, Nadder, and the Bourn. The city, which is regularly laid out, is chiefly interesting for its historic associations and antiquities, and for its magnificent cathedral, built between 1220 and 1258, entirely in the Early English style, and on a uniform and well-arranged plan. The spire (404 feet) was added between 1335 and 1375, and is the highest in England. (See illustration under *Gothic Architecture.*) Salisbury was at one time celebrated for its woollen manufactures and fine cutlery, but these industries are now all but extinct. Salisbury returns one member to the House of Commons. Pop. 17,362

Salisbury, EARL OF. See *Cecil.*

Salisbury, ROBERT ARTHUR TALBOT GASCOYNE CECIL, K.G., THIRD MARQUIS OF, English statesman, was born at Hatfield (county of Herts) in 1830, and educated at Eton and Oxford. As Lord Robert Cecil

Marquis of Salisbury.

he entered parliament as member for Stamford in 1853, and gradually made his way till in 1866, on the formation of Lord Derby's third administration, he was appointed secretary of state for India. In 1865 he became Lord Cranborne and heir to the marquisate, on the death of his elder brother. Owing to difference of opinion on the subject of the franchise he retired from the ministry, but on the death of his father in 1868 and his consequent elevation to the House of Lords he returned to his old party associations. He resumed the secretaryship for India in the Disraeli government of 1874. He took part in the conference of Constantinople, which was expected to settle the dispute between Russia and Turkey; and at the end of that war, having become foreign minister, he insisted on the treaty which Russia had forced on Turkey being submitted to a congress of the powers. In 1878 he accompanied Disraeli to the congress at Berlin, and on the death of that statesman became the recognized leader of the Conservative party. He became premier as well as foreign secretary on the fall of the Gladstone government in 1885. Gladstone succeeded again to power in the end

of the same year, but in June following was defeated on the Irish bills (see *Ireland*), when Lord Salisbury again became premier and foreign secretary, with the approval and support of the Liberal Unionists. This position he held till 1892, and in 1895 he entered on a third term as premier, succeeding Lord Rosebery. In his early days Lord Salisbury was a contributor to periodical literature; of late years he has devoted much time to scientific pursuits.

Salisbury Plain, a tract of downs and heath in Wiltshire, England, between Salisbury and Devizes, about 20 miles in length, and 14 broad. The government have purchased 60 square miles of it for military purposes. Stonehenge is here.

Sali'va, the transparent watery fluid secreted by glands connected with the mouth. The quantity secreted in twenty-four hours varies; its average amount is probably from 1 to 3 pints. The purposes served by saliva are mechanical and chemical. It keeps the mouth in a due condition of moisture, and by mixing with the food during mastication it makes it a soft pulpy mass, such as may be easily swallowed. The chemical action of saliva on the food is to convert the starchy elements into some kind of sugar. The salivary *glands* are compound tubular glands known as the *parotid*, the *sub-maxillary*, and the *sub-lingual*, and numerous smaller bodies of similar structure, and with separate ducts, which are scattered thickly beneath the mucous membrane of the lips, cheeks, soft palate, and root of the tongue. Salivary glands are absent in some mammals and reptiles, and in most fishes.

Salivation, a superabundant secretion of saliva, either determined locally by the use of masticating irritants, or by means which act upon the whole system, especially by mercurial preparations. In the last case it is accompanied by a coppery taste, by swelling of the gums, and sometimes by looseness of the teeth. Salivation is usually diminished by the use of astringents, laxatives, &c.

Salix. See *Willow.*

Sallee', a fortified seaport on the western coast of Morocco, on the Atlantic, 106 miles west of Fez, at the mouth of the Buregreb, formerly a stronghold of Moorish piracy. On the opposite side of the river stands Rabat (which see). Pop. about 12,000.

Sallow, a common name for several species of willow. See *Willow.*

Sallow-thorn (*Hippophaë*), a genus of plants of the natural order Elæagnaceæ. *Hippophaë rhamnoides*, a spiny shrub with dicœcious leaves and small orange-coloured berries, growing on cliffs near the sea, is the only species found wild in Great Britain.

Sallust, Caius Sallustius Crispus, a Roman historian, born B.C. 86 at Amiternum, died at Rome B.C. 34. He became tribune in B.C. 52, and in the civil war sided with Cæsar. In B.C. 47 he was prætor elect, and in the following year accompanied Cæsar to the African war, where he was left as governor of Numidia. He returned with immense wealth, was accused of maladministration and oppression, and after Cæsar's death lived in luxurious retirement. Sallust wrote several historical works in a clear and concise style. His Bellum Catilinarium is a history of the Catiline conspiracy. The Jugurtha, or Bellum Jugurthinum, is a history of the war against Jugurtha, king of Numidia, from B.C. 111 to B.C. 106.

Sally-port, in fortification, a postern, or a passage underground from the inner to the outer works, to afford free egress to troops in making a sally, closed by massive gates when not in use.

Salma'sius, Claudius (the Latinized name of Claude de Saumaise), a French scholar, born in 1588, died 1653. In 1651 he succeeded Joseph Scaliger as professor in Leyden University. In 1649 he wrote a defence of Charles I. (Defensio Regia pro Carolo I.), which was brilliantly answered by Milton's Defensio pro Populo Anglicano. His other important works are: Plinianæ Exercitationes in Solinum; Scriptores Historiæ Augustæ; De Mutuo; Observationes in Jus Atticum et Romanum; &c.

Salmon (*Salmo salar*), a well-known fish, forming the type of the family Salmonidæ (which see). The salmon inhabits both salt and fresh waters, and ranks prominent among the food-fishes of Britain and other countries. It generally attains a length of from 3 to 4 feet, and an average weight of from 12 to 30 lbs., but these limits of size and weight are frequently exceeded. The typical colour of the adult fish is a steel-blue on the back and head, becoming lighter on the sides and belly. Teeth are present in the upper and lower jaws, palate, and vomer or roof of the mouth; the edges of the tongue are also toothed or notched. The food consists of animal matter, and must vary with the change of habitat from salt to fresh water, and *vice versa*. In the autumn the salmon quits the sea and ascends the rivers for the

SALMON.

The plate includes illustrations of the three migratory British species of Salmonidæ: the Salmon proper, Salmon Trout, and Bull Trout. Of the Common Salmon (*Salmo salar*), the various stages of growth are shown; the egg (with a magnified specimen showing the appearance when the eyes first become visible), parr, smolt, grilse, and full-grown fish. When the young first release themselves from the egg they are about $\frac{5}{8}$ inch long, and are provided with a sac or yolk-bag beneath the belly, from which they draw their nutriment until the sac is completely absorbed. At 6 weeks the "parr", as they are then called, are about $1\frac{1}{2}$ to 2 inches in length, and at 6 months about 4 inches. In this stage they are distinguished by the "parr markings", bars of darker colour on the upper part of the body. After about 14 months to 2 years (the period varies greatly under different circumstances) the fish assume a livery of silvery scales, and they then begin to make their way to the sea. When the silvery scales appear the fish become "smolts", and usually weigh from 1 to 2 ozs. When the sea is reached the growth of the fish is extremely rapid, so that in three months or less the smolts may return to the fresh water as "grilse", weighing from 4 to 6 lbs. They spawn in the fresh water about November or December, return to the sea, and reascend next spring as salmon, weighing up to 10 or 12 lbs. Salmon and grilse after spawning are called "kelts", and are unfit for food. During the spawning season the male salmon assumes a beautiful rose-colour; he develops a horny hook at the end of the lower jaw, and will fight to the death with any other fish who dares dispute his marital rights, tearing him open with this hook.

The smolts, before migrating to salt water in spring, congregate in "sculls" of 40 to 70, and pass down the rivers at an average speed of about 2 miles an hour. They stay 2 or 3 days in brackish water, and then go off to sea, returning as grilse to the fresh water, as above stated. The scales at the time of their migration to the sea are of dark-blue or bluish-green on the upper half of the body and head, with black and carmine spots; the gill-covers and lower part of body are silvery; the scales come off readily, and expose the parr marks below.

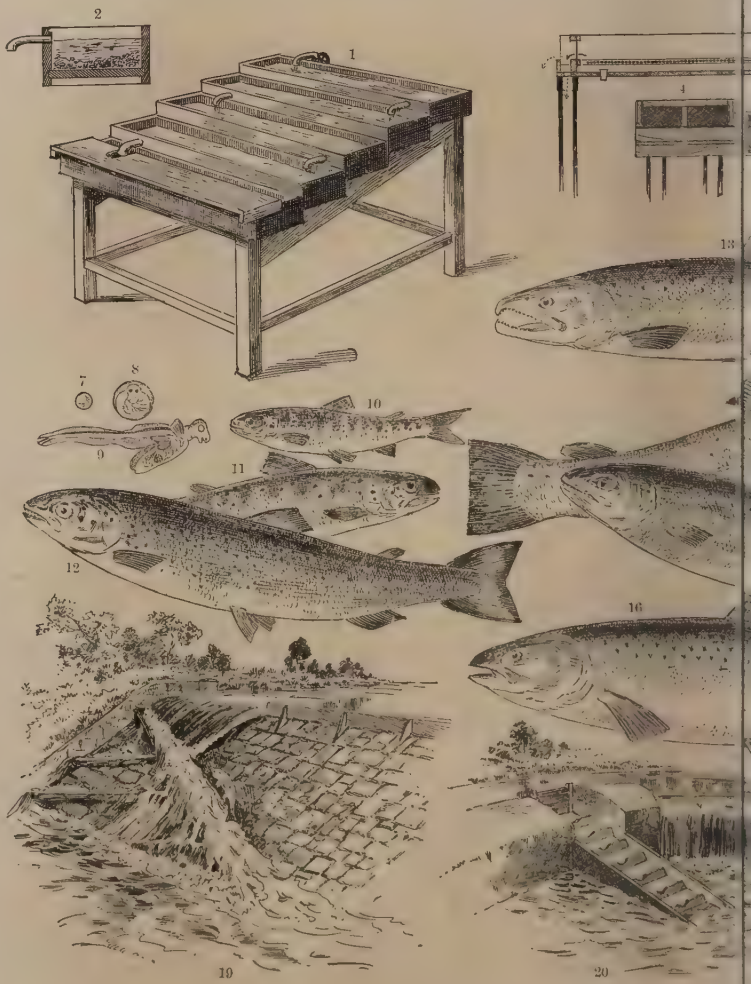
There are many species of American Salmon, of which two are illustrated on the plate, viz. the "Kisutch" or Silver Salmon (*Oncorhynchus kisutch*, the specimen drawn is from Unalashka), and the *Oncorhynchus tchawytcha* (or *chawicha*) or Californian Salmon, familiar to us as "tinned salmon"; weight, 4 lbs. to 80 lbs. or more.

The first figures on the plate represent a simple apparatus for the hatching of salmon, such as is used in the Frank Buckland exhibit at South Kensington. It consists of a series of slate boxes, from 5×3 to 7×5 inches in the clear, and say 36 inches long. A thin layer of gravel is spread upon the slate bottom, and wooden covers are provided to keep out the light. Water is led into the uppermost box and overflows into the others in succession. From 1500 to 3000 ova can be hatched in each of these boxes.

In the centre of top of plate is illustrated the method of hatching adopted in the establishment at Howietoun, near Stirling. Here the ova lie upon "grilles", consisting each of about 100 short glass rods fitted

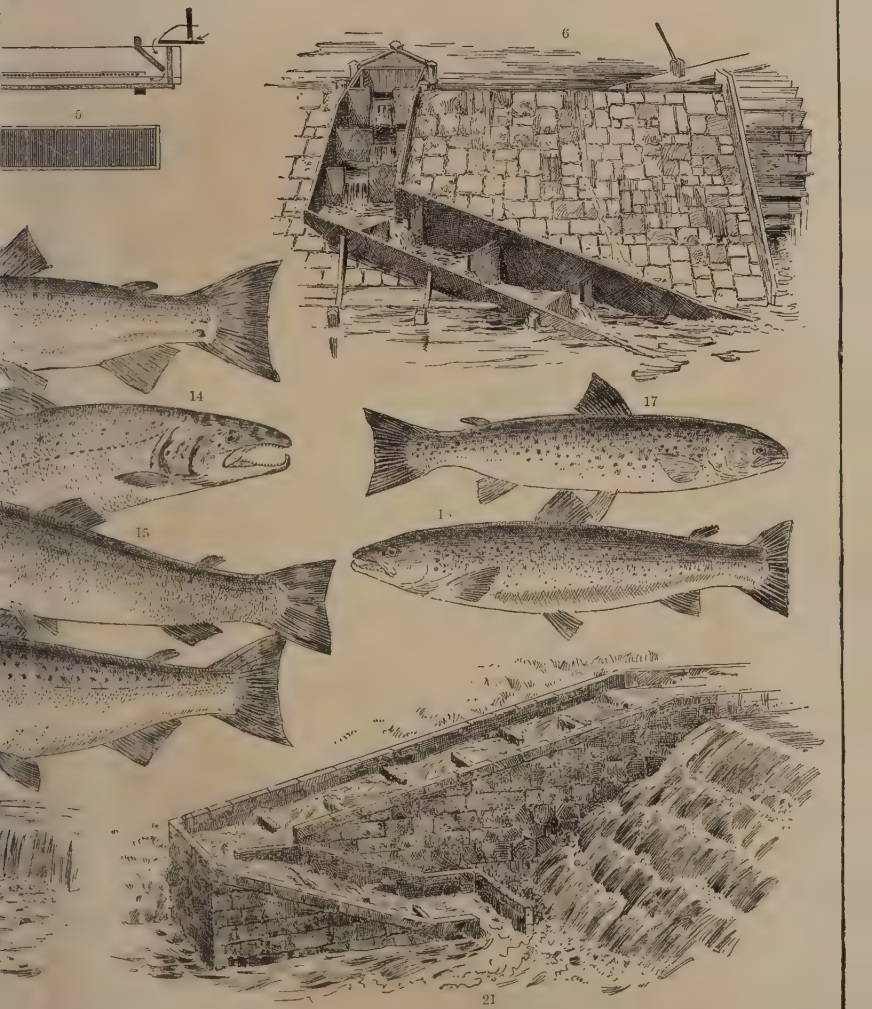
into a light wooden frame. Four of these frames are then arranged in a box, made of yellow pine and charred on the inside, of the shape shown in the drawing, and the external dimensions of which are 7 feet $5\frac{1}{2}$ inches $\times$ 1 foot 10 inches $\times$ $10\frac{1}{2}$ inches. A number of these boxes are arranged in convenient order in each hatchery. The grilles lie in such a position that the water, which is led to them by means of a wooden trough and spout, fitted with a small sluice to regulate the flow, passes across, not along, the glass rods, and out at the perforated zinc screen at the end of the box, which can be dammed up with flannel if it is necessary to keep a greater depth of water in the box. It is found that spring-water answers best for ova, and river-water for the fry; and it should be kept at a temperature of 45°. About 14 gallons of water per minute are allowed for every 100,000 eggs.

The remaining illustrations represent various devices by which the fish, in ascending to the spawning-grounds, are assisted to pass such obstructions as a weir or a deep fall occurring in the course of the stream. A portion of the water is led to a "ladder", in which its descent is broken by a succession of transverse pieces reaching only partly across the ladder, or to a succession of pools at graduated levels, from one to the other of which the fish may pass without undue difficulty. It is of some importance that the foot of the ladder should be situated near that part of the stream which is most frequented by the fish.



52

1 Hatching-boxes for small hatchery. 2 Section of slate hatching-box. 3 Hatching-box with glass gril
9 Fry (magnified). 10 Parr. 11 Smolt. 12 Grilse. 13 Kisutch, or American Silver Salmo
Salmon (*Oncorhynchus Chawicha*). 17 Salmon Trout (*Salmo Trutta*). 18 Bull Trout (*Salmo Eriox*).



or large hatchery. 4 End of box. 5 Plan of grille. 6 Salmon-pass with ice-break. 7 Egg. 8 Do. (magnified).
corhynchus Kisutch). 14 Common Salmon (*Salmo Salar*): Male. 15 Female (*Salmo Salar*). 16 Californian
Salmon-pass for small weir. 20 Salmon-pass as at Acklington Dam, River Coquet 21 Salmon-pass for large weir.

purpose of spawning, often having to surmount considerable obstacles, such as falls of some height, in its progress. In many streams they are now assisted in this by artificial structures known as 'salmon-ladders,' or the like. The eggs are deposited in a shallow trough or groove excavated in the gravelly bed of the river. After spawning, the salmon, both male and female, return to the sea under the name of *spent-fish*, *foul-fish*, or *kelts*, the females being further distinguished as *shedders* or *baggits*. In from 70 to 150 days the young fish emerges from the egg, and in its embryo state it is not unlike a tadpole, being on the average about one and a quarter inches in length. About 50 days later it assumes the appearance of a fish and now approaches the definite or *parr* stage of its existence, beginning to be marked by transverse bars of dark colour. It usually continues in the shallows of its native stream for two years after hatching, and during this period it attains a length of 8 inches. When the season of its migration arrives, generally between March and June, the fins have become darker and the fish has assumed a silvery hue. It is now known as a *smolt* or *salmon fry*. The smolts now congregate into shoals and proceed leisurely seaward. On reaching the estuary they remain in its brackish water for a short time and then make for the open sea. Leaving its native river as a fish, weighing it may be not more than 2 ozs., the smolt, after three months' absence, may return to fresh water as a *grilse*, weighing 4 or 5 lbs. In the grilse stage or *salmon peel*, as it is sometimes called, the fish is capable of depositing eggs. After spawning in the fresh water the grilse again seeks the sea in the autumn, and when its second stay in the ocean is over it returns after a few months' absence as the adult salmon, weighing from 8 to 10 lbs. The salmon returns as a rule to the river in which it passed its earlier existence. The fertility of the fish is enormous: it has been calculated that over 150,000,000 of salmon ova are annually deposited in the Scotch river Tay alone, and of these only about a third come to life and attain the parr stage, whilst of these parrs only 20,000,000 become smolts; and in time only 100,000 remain as perfect salmon, of which 70,000 are caught and 30,000 left for breeding purposes. Salmon are caught by the rod, and by means of nets. For purposes of commercial supply they are taken in nets of special construction and of various forms, the fishings being regulated by law not only as to their seasons and times, but also as to the forms and dispositions of the machines for the capture of the fishes. Stake-nets supported on piles of wood and extending out into the sea, and 'bag' or 'drift' nets are the means most frequently employed in the British salmon fishery. The fishings are arranged according to districts, and in every district the annual close time is 168 days. In most rivers the close time is from 27th August to 10th February. But in several cases these dates vary, and by special act the Tweed close time is from 14th September to 15th February for all but rod-fishing. In former days the practice known as 'burning the water' used to be resorted to in Scotch waters for the capture of salmon. It consisted in attracting the fishes by the glare of burning torches, when they were speared with the 'leister' —a sharp fork—or taken by other means. The chief salmon fisheries are those of the Tweed, Tay, North Esk, Dee, Spey, Severn, and some Irish rivers; there are important fisheries in some European and North American rivers. In Europe the fish is found between the latitudes of 45° and 75°, in North America in corresponding latitudes. The flesh of the salmon when fresh is of a bright orange colour, and is of highest flavour when taken from the sea-feeding fish. Of the same genus as the common salmon is the salmon-trout, the common river-trout, Lochleven trout, &c. What is known as the 'land-locked' salmon, which is found in Norway, Sweden, Maine, and New Brunswick, and is so called because it remains in inland waters and does not descend to the sea, is by some regarded as a distinct species from the common salmon, by others not. In the waters of North-western America are several salmon belonging to a distinct genus, *Oncorhynchus*, including the quinnat or king-salmon, blue-back salmon or redfish, silver salmon, dog salmon, and humpback salmon. The quinnat (*O. tchawytcha*) has an average weight of 22 lbs., but sometimes reaches 100 lbs. Both it and the blue-back salmon (*O. nerka*) are caught in immense numbers in the Columbia, Sacramento, and Frazer (especially in spring), and are preserved by canning. Attempts have been made to introduce the quinnat into eastern North America and Europe. The flesh of these salmon is indistinguishable from that of the common form. The

salmon is one of the fishes that are important objects of pisciculture (which see), and various species of the family have been introduced into waters not previously inhabited by them. Recently large numbers have died in British waters from a destructive skin disease accompanied or caused by a fungoid growth (*Saprolegnia*).

Salmon-fishing, Law of. See *Poaching.*

Salmon'idæ, a family of teleostean fishes, belonging to the subdivision Malacopteri of that order. To this family belong the various species of salmon (see *Salmon*), the trouts, the char, the grayling, the smelt, the vendace, white-fish of America, &c. The Salmonidæ are abdominal Malacopteri, in that their ventral fins are placed backwards on the belly. The body is covered with cycloid scales; the head is naked, and there are no barbels. The belly is rounded, and there is a small adipose fin behind the dorsal. Pyloric appendages of the stomach are generally numerous and rarely absent. The air-bladder is large and simple. The ova fall into the cavity of the abdomen before exclusion. Salmonidæ are inhabitants of the sea or fresh-water, or both.

Salmon-trout, or Sea-trout (*Salmo trutta* or *S. eriox*), a species of salmon which grows to a length of 3 feet, and is more numerous in Scotland than in England or Ireland. It resembles the salmon in form and colour, and is, like it, migratory, ascending rivers to deposit its spawn.

Saloni'ca (ancient, *Thessalonica;* Turkish, *Saloniki*), a large seaport of Turkey in Europe, on a gulf of the Ægean Sea, 315 miles w.s.w. of Constantinople, rising from the sea in the form of an amphitheatre, and forming a mixture of squalor and splendour. In Salonica may still be seen vestiges of Cyclopean and Hellenic walls, triumphal arches, and remains of Roman temples, Byzantine structures, and Venetian castles. Its harbour is excellent, and its roadstead well sheltered, and, next to Constantinople, it is the most important city of European Turkey. The principal exports are cotton, corn, tobacco, timber, and wool; imports, sugar, coffee, indigo, calicoes, &c. The manufactures include cotton, silk, leather, carpets, &c. Thessalonica was founded in room of an older town in 315 b.c., and has had a somewhat eventful history. St. Paul preached the gospel here, and addressed two of his epistles to the Christian converts. Railways run to Vienna and Constantinople. Pop. 150,000, half being Jews and Greeks.

Salop, County of. See *Shropshire.*

Salpa, a genus of ascidian or tunicate mollusca forming the representative example of the family Salpidæ. These animals are found floating in the Mediterranean and the warmer parts of the ocean, and are protected by a transparent gelatinous coat, perforated for the passage of water at both extremities. They are frequently phosphorescent, and are met with in two conditions known as *single* and *chain salpæ.* Each salpa is of oval or quadrate form, and the organs of the body occupy a comparatively small space within the body-cavity. *Salpa maxima* is the most familiar species.

Sal Prunella, nitre which has been fused and cast into cakes or balls, and used for chemical purposes. See *Nitre.*

Sal'safy (*Tragopogon porrifolius*), belongs to the natural order Compositæ, and is allied to the endive and dandelion. It is cultivated for the use of its long, white, fleshy roots, which are cooked and served in various ways. The leaves are narrow and long; the flowers are solitary and terminal, with violet purple corollas. See *Goat's Beard.*

Salse, an eruption of hot acidulated mud from a small orifice, generally in volcanic regions, and frequently accompanied by steam and gases at a high temperature, which act powerfully on the surrounding solid matters, disintegrating and decomposing them, and forming new compounds. In some districts the gases are inflammable, and flames issue from the orifices.

Salsette', a large island to the north of Bombay, and connected with Bombay island by bridge and causeway; area, 241 square miles. (See *Bombay.*) A broad range of hills runs along the centre of the island from north to south, while the lowlands are much intersected by tidal creeks. There are no large fresh-water streams; but the supply of water from wells is of fair quality, and pretty constant. The staple crop is rice, and most of the uplands are reserved for grass for the Bombay market. The coast abounds in cocoa-nut groves, and the palmyra-palm grows plentifully over most of the island. The island is remarkable for its cave architecture. Pop. 108,149.

Sal'sify. See *Salsafy.*

Salsil'la, a name of several amaryllidaceous plants producing edible tubers, and belonging to the genus *Bomarea,* or to the closely-allied genus *Alstrœmeria.* One species (*B.* or *A. edŭlis*) is cultivated in the West

Indies, its roots being eaten like the potato; it is diaphoretic and diuretic. Other species, such as *B. Salsilla*, are natives of the Peruvian Andes, and are pretty twining plants with showy flowers.

Sal'sola, saltwort, a genus of plants which belongs to the natural order Chenopodiaceæ, and comprises about forty species of mostly hardy herbs, shrubs, or sub-shrubs, of variable habit, mainly natives of saline districts in temperate regions. The ashes of *S. Kali*, the prickly saltwort, a British plant, and of *S. Soda*, a south European and North American species, were formerly much used in the production of an impure carbonate of soda, known as *barilla*.

Salt, in chemistry. It is impossible to state in very precise terms what is the idea attached to the word salt, as at present used in chemical science. It may perhaps be most correctly defined by saying that it implies the capability of readily undergoing *double decomposition*. In its most restricted signification the word salt suggests a substance, which, if soluble in water, can produce *rapid* double decompositions with other soluble substances, or if insoluble, can be produced as a precipitate, as the result of a rapid double decomposition taking place between soluble substances. This is certainly the idea suggested by the application of the word salt to nitrate of potassium, chloride of sodium, &c. The term salt is also sometimes applied to substances which, like chloride of ethyl, give rise to *slow* processes of double decomposition with aqueous solutions of the salts specially so called. The name is, however, most commonly and most appropriately applied to those bodies of which reaction by double decomposition is the most characteristic property, and which exhibit such reactions under the most familiar conditions.

Salt, Common (chloride of sodium, Na Cl), a substance in common use as a seasoner and preserver of food from the earliest ages. It exists in immense quantities dissolved in sea-water, and also in the waters of salt springs, and in solid deposits, sometimes on the surface, sometimes at greater or less depths, in almost every geological series. Rock-salt, that is salt in the crystalline or solid form, is found in great abundance in Cheshire, Yorkshire, and Worcestershire. It is also found in abundance in nearly every country of Europe. The supply in other continents is equally great. The basin of the Indus and other parts of India possess extensive salt plains. In China deep salt-wells abound. The Sahara and Central and Southern Africa afford inexhaustible supplies. Most of the South American Republics, the West Indies, and the United States also have large natural supplies. Salt manufactured from sea-water is produced extensively along the Mediterranean and Atlantic sea-boards of Europe as well as in America. It is chiefly made by natural drying in shallow reservoirs, but also by boiling. Sun-dried salt is the purest. Salt from sea-water is usually known as *bay-salt*. Most salt, however, is produced from rock-salt or from brine springs, the latter being due to the melting of rock-salt by water. The salt-mines of Wielicza in Galicia were worked in the 12th century, and are the most celebrated in the world. England produces and exports more salt than any other country. The chief manufacturing centres are in Cheshire, Durham, and Worcestershire; Yorkshire also now produces salt. Cheshire yields the greater bulk, the chief supply being found in the basin of the Weaver; Northwich is the central point of the trade. The supply is here derived from springs and mines, the springs being at present the chief sources of supply. The rock-salt is purified by dissolving it in water, and evaporating in shallow pans by artificial heat. In 1895 the exports of salt from Great Britain amounted to 740,948 tons valued at £546,219. It is estimated that upwards of 500,000 tons are used for home consumption—300,000 tons for domestic use, and 200,000 tons for manufacture and manure. Salt was subject to a duty in ancient Rome, and this example has been generally followed in modern states. One of the most oppressive of the salt taxes in Europe was the French *gabelle* (see *Gabelle*). In Great Britain salt-duties were imposed in the reign of William III., but the tax was abolished in 1823. In British India salt is an important source of revenue. Salt is used as a glaze for coarse pottery, as a mordant, for giving hardness to soaps, for improving the clearness of glass; it is the source of soda and of chlorine, and is thus of immense industrial importance.

Salt, Sir Titus, born at Morley in Yorkshire in 1803, died 1876. He commenced business as a woollen manufacturer in Bradford in 1824, and rapidly acquired a fortune. In 1853 he began the erection of a model manufacturing village, on the banks of the Aire (Saltaire; which see). He represented Bradford as a Liberal 1859–61,

and was made a baronet in 1869. He was the head of the firm of Titus Salt, Sons, & Co., and was a liberal benefactor to many public institutions.

Salta, a province and town of the Argentine Republic. The province, which is the frontier one to the north, consists of ramifications of the Andes, fertile valleys, and wooded or pasture lands; area, 45,000 square miles. The chief rivers are the Vermejo and Salado. Pop. 200,000.—The town is about 800 miles north-west of Buenos Ayres, at the bottom of a marshy valley, liable to occasional inundations, has a neat appearance, possesses a cathedral and several churches, but from its situation is unhealthy. Pop. 12,000.

Saltaire, a town, West Riding, Yorkshire, on the river Aire, 4 miles N.W. of Bradford. It is a model town, with well-planned streets, and is named after its founder, Sir Titus Salt, who planted here his vast factories for the manufacture of alpaca, and built dwellings for his employés.

Saltash, a market town in Cornwall, on river Tamar, 3 miles N.W. of Devonport. It carries on fishing and an active coasting trade. The Albert Bridge, a railway bridge 2240 feet long, crosses the estuary of the Tamar at a height of 100 feet. Pop. 2541.

Saltburn-by-the-Sea, a small town and watering-place in the North Riding, Yorkshire, 4 miles S.E. of Redcar. It is situated on lofty cliffs facing the sea, and combines the charms of maritime and inland scenery. Among its attractions are the sands, extending about 8 miles along the coast, and a pier 1500 feet long. Pop. 2232.

Saltcoats, a town of Scotland, in Ayrshire, on the Firth of Clyde, 29 miles south-west of Glasgow. The inhabitants are mainly employed in coal-mines, shipbuilding-yards, iron-foundries, and dynamite works. Pop. 5895.

Saltillo (sȧl-til′yō), a town of Mexico, department of Coahuila, on the Tigre, a well-built town, with extensive manufactures of woollen blankets and serapes or ponchos. Pop. 23,000.

Saltire.

Saltire, in heraldry, an ordinary in the form of a St. Andrew's cross, formed by two bends, dexter and sinister, crossing each other. See *Heraldry*.

Salt Lake, GREAT. See *Great Salt Lake*.

Salt-lake City, the capital of the state of Utah, in the United States, 2 miles from the Jordan, and 11 miles from Great Salt Lake. It stands at the base of Wasatch Mountains, 4550 feet above sea-level. The streets are wide, and the dwellings generally small and of one story. The most remarkable public buildings are the Mormon tabernacle, a large ungainly building with a roof like a dish-cover, the Mormon temple, and the city-hall. The city is lighted by gas and electricity, and has street tramways, &c. It is the metropolis of the Mormons, and was first settled in 1847 by the followers of Brigham Young. Pop. 44,843.

Salt of Sorrel. See *Oxalic Acid*.

Saltpetre. See *Nitre*.

Salt Range, a hill system of India, in Jehlam, Shahpur, and Bunno districts of the Punjab, deriving its name from its extensive deposits of rock-salt; greatest height 5010 feet.

Salts, SMELLING, a preparation of carbonate of ammonia with some agreeable scent, as lavender or bergamot, used by ladies as a stimulant and restorative in fits of faintness.

Saltwort. See *Salsola*.

Salute, ARMY and NAVY, the firing off of guns in honour of any person of rank or distinction. According to the rank of the person to be saluted, the number of guns fired varies from 21 (a royal salute) to 7 for consuls and officers of inferior rank. A general salute is given by a body of troops on parade to a general officer by presenting arms.

Saluzzo (sȧ-lụt′zō), a town of Italy, Piedmont, province of Cuneo, 30 miles south by west of Turin. It consists of an upper and a lower town, is the see of a bishop, and has a large, interesting, and handsome cathedral begun in 1480. Pop. 9716.

Salvador′, a republic in Central America, lies along the coast of the Pacific, and is bounded by Honduras on the north and east, and by Guatemala on the north-west; area, 7212 square miles. A range of volcanic peaks, varying in height from 4000 to 9000 feet, runs through the centre of the country, dividing an interior valley from the lowlands on the coast. The largest river is the Lempe, which is only navigable in parts. The soil is remarkably fertile. The most important crop is indigo, which is of excellent quality. Maize, sugar, coffee, tobacco, cotton, &c., also thrive well. Cattle-breeding is carried on, but not extensively. The manufactures are unimportant. The chief

exports are coffee, indigo, silver, raw sugar, balsam of Peru, leather, &c. They are of the annual value of about £800,000. The population consists of a small number of whites (of Spanish descent), Spanish-speaking Indians, and half-breeds. The established religion is Roman Catholicism. The government is carried on by a president and four ministers. There is a congress of seventy deputies elected by universal suffrage. The inhabitants had long the reputation of being the most industrious in Central America, and the state, in proportion to its size, is still the most densely peopled. Pop. 803,534. Salvador remained under Spanish rule until 1821, when it asserted its independence, and joined the Mexican Confederation. In 1823, however, it seceded from the Confederation, and subsequently formed part of the Republic of Central America. In 1853 it became an independent republic. Its progress has been much hindered by internal dissensions, revolutions and counter-revolutions following each other without end. The capital is San Salvador.

Salvado'ra, a genus of plants, type of a nat. order (Salvadoraceæ) of monopetalous dicotyledons, allied to Oleaceæ and Jasminaceæ. They have stems with slightly swollen joints, opposite entire leaves, and loose branching panicles of small flowers. *S. persica* is supposed to be the mustard-tree of Scripture, which has very small seeds, and grows into a tree. Its fruit is succulent, and tastes like garden cress. The bark of the root is acrid.

Salvage, a recompense allowed by law to anyone, by whose voluntary exertions ships or goods have been saved from the dangers of the sea, fire, pirates, or enemies.

Salvation Army, a religious organization originated in East London by William Booth, the leader and general, in 1865. The society was developed into its present form and received its name in 1878. Latterly several agencies more directly philanthropic have been grafted on it for helping the needy and outcast. With the name *army* came military phraseology. A semi-military attire was assumed, barracks were built, and the army marches out with banners displayed and bands of music. Music (drums, cornets, &c.) is also employed in the meetings, and other proceedings of a sensational character. The object is to attract people who would not enter church or chapel, and for this cause public-houses, prisons, &c., are visited, and open-air meetings are held. The weekly journal of the army is the War Cry. The army now carries on operations in most countries of the world, and has a revenue exceeding £790,000 per annum.

Salva'tor Rosa. See *Rosa.*

Salvia, the genus of plants to which sage, clary, &c., belong.

Sal Volatile (vo-lat'i-lē), carbonate of ammonia. The name is also applied to a spirituous solution of carbonate of ammonia flavoured with aromatics.

Salwin', SALWEEN', or SALWEN, a river of Burmah, with a general north and south course, parallel to the Irrawady, rising in South-western China, and falling into the Indian Ocean (Gulf of Martaban), the towns of Martaban, Moulmein, and Amherst being at or near its mouth. The river course is interrupted by rocks and rapids, but vessels of the largest size can reach Moulmein. Vast quantities of teak are annually floated down the Salwin and shipped at Moulmein for export. The area of the Salwin basin is 62,700 square miles; the river is 800 miles in length, and from 1 to 4 miles in breadth.

Salzbrunn (sälts'brun), a town of Prussian Silesia, 43 miles by railway from Breslau, 1270 feet above the sea, with saline mineral springs, which cause a considerable influx of visitors from May to October. The waters are cold, are used both for bathing and drinking, and are recommended for gravel and gout. Pop. 6459.

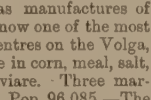
Salzburg (sälts'burh), a city of Austria, capital of the Duchy (or province) of Salzburg, is most picturesquely situated on both banks of the rapid Salza, which is here hemmed in between two isolated hills, 63 miles south-east of Munich. It is partly walled, and has several handsome squares and streets, ornamental grounds, park, and river promenades. The principal edifices are the cathedral (1614–28) built in imitation of St. Peter's, Rome, several other churches; the archbishop's palace (now belonging to the town), imperial palace, exchange, museum, and several benevolent institutions. It was the birthplace of Mozart, and there is a bronze statue of the composer by Schwanthaler. There is a theological college, and other high-class educational institutions, extensive libraries, &c. The manufactures are varied, but not individually of importance. The environs of Salzburg furnish charming scenery. The town was the see of a bishop in the 7th century, which in 798 was raised to an archbishopric. The bishops of Salzburg were princes of the German Empire, and held the

position of sovereigns over the archbishopric till it was secularized in 1802. Pop. 24,952.—The Duchy or crown-land of Salzburg, area 2767 square miles, is a rugged mountainous country, intersected by numerous valleys, chiefly pastoral, but in many of them much corn and fruit are raised. Wood is abundant, and the minerals, which are very valuable, include gold, silver, lead, copper, cobalt, iron, salt, and marble. Pop. 168,278.

Salzkammergut (zälts'käm-ér-göt), a district in Upper Austria, between Salzburg and Styria, with an area of 340 square miles. It is alpine throughout, is celebrated for its scenery, and contains the beautiful lakes of Traun and Hallstädt. It has little arable land, but rears great numbers of cattle; is well wooded, and is rich in minerals, including marble, coal, and more especially salt. The chief towns are Ischl and Laufen. Pop. 18,000.

Salzwedel (zälts'vā-dl), a town of Prussia, 54 miles N.N.W. of Magdeburg, on both sides of the Jeetse; with various manufactures. Pop. 8886.

Samar', one of the Philippine Isles, separated by channels from Luzon on the north, and Leyte on the south. Area, 5000 square miles. The island is densely wooded and the soil fertile. The chief products are rice, cocoa, palm-oil, hemp, and timber. Pop. 194,027.



Samara of the Common Maple.

Sam'ara, a name given in botany to an indehiscent fruit, producing a wing from its back or end; such as the fruit of the maple, ash, &c.

Sama'ra, a town of Russia, capital of the government of same name, 550 miles E.S.E. of Moscow, at the confluence of the Samara with the Volga. It has manufactures of leather and soap, and is now one of the most important commercial centres on the Volga, carrying on a large trade in corn, meal, salt, linen, wool, fish, and caviare. Three markets are held annually. Pop. 96,085.—The government lies on the left bank of the Volga, and has an area of 64,985 square miles. A great part is flat and fertile, but is at present little cultivated. There is little wood. Wheat and other kinds of grain are the chief products. There are a considerable number of Swiss and German colonists here, also Nogai Tartars, Bashkirs, and Kirghis. Pop. 2,650,580.

Samarang', town of Java, on the north coast of the island, near the mouth of the Samarang river. Next to Batavia and Surabaya it ranks as the most important commercial port of Java. Its harbour is not good, and large ships have to anchor at some distance from the shore. Pop. 72,919.

Samaria, or SEBASTE (modern *Sebustieh*), an ancient town of Palestine, formerly capital of the Kingdom of Israel, finely situated on a hill surrounded by higher hills, 36 miles N.N.W. of Jerusalem. Samaria was built by Omri, king of Israel, about B.C. 925, and was the metropolis of the ten tribes till they were carried away into captivity about B.C. 720. After its destruction by John Hyrcanus it was rebuilt, and given by Augustus to Herod, who gave it the name of Sebaste. There is now an insignificant village here and some striking ruins.

Samaritan Pentateuch, an ancient version of the five books of Moses, which has been preserved by the Samaritans as the canonical Scriptures have by the Jews.

Samaritans, a mixed people, who inhabited the region between Judæa and Galilee, and who formed a sect among the Jews. They consisted partly of the tribes of Ephraim and Manasseh left in Samaria by the King of Assyria when he had carried their brethren away captive, and partly of Assyrian colonists. On the return of the Jews from captivity they declined to mix with the Samaritans, though united with them in religion. The latter attempted to prevent the Jews from building the temple at Jerusalem, and, failing in this, they built a temple on Mount Gerizim exclusively for their own worship. A few—but now only a very few—of the race still exist at Nablus (which see). They adhere strictly to the Mosaic law, but are regarded by the Jews as heretics, as they accept only the Pentateuch, of which they have a special version of their own. They believe in angels, in a resurrection and future retribution, and expect the coming of a Messiah, in whom they look only for a prophet. In the synagogue the Aramaic Samaritan dialect is used, but they speak Arabic. They avoid connection with other sects, and marry only among themselves.

Samarkand', a city of Asiatic Russia, on the Zerafshan river, 130 miles E. of Bokhara, situated in a fertile plain. It consists of the new Russian portion, the citadel, and the old town. The tomb of Tamerlane is a building paved with white marble. Mosques, colleges, and bazaars

are the other large buildings. It was once the capital of a powerful Asiatic kingdom, and subsequently of Tamerlane's empire. Samarkand was ceded to Russia in 1868, since when extensive irrigation works have been constructed, and the Transcaspian Railway now extends to the city. It contains 80 schools with about 1500 pupils. Pop. 36,000. See *Bokhara*.

Sambas, a town of Western Borneo, on the river Sambas not far above its mouth, seat of a Dutch resident. Pop. 10,000.

Sambor, a town of Austria, in Galicia, on the Dniester. Pop. 13,586.

Sambre (säṅ-br), a river of N. E. France and Belgium, a tributary of the Meuse, which it enters at Namur; length 110 miles, great part of which is useful for navigation.

Sambu'cus, a genus of trees. See *Elder*.

Sambur (or SAMBOO) **Deer**. See *Rusa*.

Sa'mian Ware, a name given to an ancient kind of Greek pottery made of Samian earth, or to a variety of Roman pottery made in imitation of this. The vases are of a bright red or black colour, covered with a lustrous siliceous glaze, with separately-moulded ornaments attached to them.

Samnites (-nīts), an ancient people of Lower Italy, who were of Sabine stock, and consisted of several tribes. They were a brave, frugal, and religious people. Their first war with the Romans resulted in favour of the latter, and secured a Samnite alliance during the Latin war (340–338 B.C.). The second Samnite war (326–304 B.C.) was a fierce contest, in which the Romans were shamefully defeated at the Caudine Forks, but were finally successful. The third Samnite war (298–290 B.C.) saw the overthrow of the Samnites and Gauls at Sentinum. When the Italian allies of Rome revolted against her in 90 B.C. the Samnites once again rose against their oppressors, but were completely subdued and almost extirpated by Sulla. The Samnites appear to have been a rude pastoral people. Their form of government was democratic.

Samo'a, or NAVIGATOR ISLES, a group of volcanic islands in the South Pacific, N.E. of the Fiji group, made up of three large islands, Upolu, Savaii, and Tutuila; and a number of smaller ones; total area about 1700 sq. miles, with a population of nearly 37,000. The most important island of the group is Upolu, with an area of 340 sq. miles, diversified by mountains and fertile plains; pop. about 17,000. Apia, the seat of government, is a town of 1500 inhabitants situated on a bay on the N.W. side of Upolu. Savaii, the largest of the group, has an area of 659 sq. miles, and is extremely mountainous (greatest height 5350 feet), the interior being hardly known. Tutuila has an area of 54 sq. miles. The government of Samoa is a limited monarchy presided over by a king and a vice-king, with a parliament of chiefs called the *malo*. The Samoans are of Polynesian extraction, and vary in colour from a dark brown to a light copper, occasionally to a shade of olive. They are of fine physique and of a gentle disposition, and are now all Christians. Their language contains thirteen letters, and is soft and liquid. The leading industries are fishing, collecting copra, the cultivation of fruit, cotton, and *taro*, and the manufacture of *tapa*, a native cloth. The cocoa-nut, bread-fruit tree, taro, and banana form the staple food of the people. Recently German intrigues have caused much trouble in Samoa, but in 1889 an agreement was made between Germany, Great Britain, and the U. States guaranteeing the neutrality of the islands, and placing each power on an equal footing as regards trade, &c.

Samos, now SAMO, an island in the Grecian Archipelago near the coast of Asia Minor, 45 miles south-west of Smyrna, forming a principality tributary to Turkey; area, 180 square miles. It has a mountainous surface, partly covered with pine forests; several fertile and well-watered valleys; produces corn, fruit, and excellent wine; and has several valuable minerals, including argentiferous lead, iron, and marble. The principal town is Vathy, with a good harbour on the north-east side of the island; The principal exports are raisins, skins, wine, and oil; imports, grain, colonial produce, and woven fabrics. Samos was inhabited in antiquity by Ionian Greeks, and had an important position among the Greek communities as early as the 7th century B.C. In the latter half of the 6th century it was in a specially flourishing condition under Polycrates, and subsequently was under the domination of Athens. In 84 B.C. it was united with the Roman province of Asia. In 1550 it was conquered by the Turks. It now occupies an exceptional position, having been erected into a tributary principality of the Sublime Porte in 1832, the ruler being a Greek prince. Pop. 49,211.

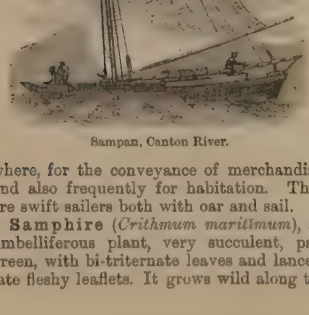
Sam'othrace, or SAMOTHRAKI, an island in the N. of the Ægean Sea, belonging to Turkey, about 14 miles long by 8 miles

broad. It has a very mountainous surface, one of its summits exceeding 5000 feet. Its chief products are corn and oil. The island is of interest as being in antiquity the chief seat of the worship of the Cabiri (see *Cabiri*), and celebrated for its religious mysteries. It is interesting also as being visited by St. Paul in the course of his second missionary journey (Acts xvi. 11). Recent archæological researches have produced valuable results.

Samovar', a Russian tea apparatus, the water in which is boiled by means of hot coals contained in an iron tube, and then poured over the tea.

Samoyedes (sam'o-yēdz), or SAMOIEDES, a people of Ural-Altaic stock, inhabiting the shores of the Arctic Ocean, both in Europe and Asia, from the Yenisei to the White Sea. They consist of two main groups, a southern resembling the Tartars, and a northern and more degraded group. They are nomadic, and live chiefly by fishing, hunting, and keeping reindeer. They are of small stature, have a flat, round, and broad face, thick lips, wide nose, little beard, black hair, in small quantity. Their religion is fetishism, though they have an idea of a great divinity; they are extremely superstitious, and generally peaceable. The reindeer supplies them with food, clothing, tents, utensils, &c. They number about 25,000.

Sampan', a boat of various build used on the Chinese rivers, at Singapore, and elsewhere, for the conveyance of merchandise, and also frequently for habitation. They are swift sailers both with oar and sail.



Sampan, Canton River.

Samphire (*Crithmum maritimum*), an umbelliferous plant, very succulent, pale green, with bi-triternate leaves and lanceolate fleshy leaflets. It grows wild along the sea-coast of Europe, and where it abounds it is used by the inhabitants as a pickle, as an ingredient in salads, or as a potherb.

Samsö (sàm'*seu*), a small island belonging to Denmark, situated in the Kattegat, between Seeland and Jutland. The soil is very fertile. The chief place is the large village of Nordby. Pop. 6599.

Samson (Hebrew, *Shimshon*, of uncertain import), an Israelite of the tribe of Dan, the son of Manoah, reckoned one of the judges of Israel, a popular hero, and an inveterate enemy of the Philistines, flourished about 1116–1096 B.C. His peculiar gift of great bodily strength is strikingly shown in the nature of his deeds, as tearing in pieces a lion, breaking his bonds asunder, carrying away the gates of Gaza, and throwing down the pillars of the house of Dagon. Previous to the latter event Delilah, his concubine, deprived him of his strength for a period by cutting off his hair, which was a violation of his obligation as a Nazarite, but with the growth of his hair his strength returned, and at the great festival of Dagon Samson pulled down the building over the heads of the Philistines, who had blinded him, he himself perishing with them. Milton has made his death the subject of a drama—Samson Agonistes.

Samsoon', or SAMSUM', a seaport, Asiatic Turkey, in the pashalic of Sivas, on a bay of the same name in the Black Sea, 166 miles W.N.W. of Trebizond. It is a steamship station, and carries on a large trade in copper, timber, tobacco, and agricultural produce. Pop. about 10,000.

Samuel (Hebrew, *Shemuel*, 'asked from,' or 'heard of God'), the first of the order of prophets and the last of the judges of Israel. He was the son of Elkanah of Ramathaimzophim, belonging to the tribe of Levi, and was consecrated by Hannah, his mother, to the service of Jehovah. He was educated in the house of the chief priest Eli at Shiloh, and had the disasters revealed to him that should befal the house of Eli. He assumed the judgeship of Israel about twenty years after the death of Eli, and headed a successful expedition against the Philistines. He mentions his own name in the list of *warlike* chiefs by whom the Lord sent deliverance to his people, and it is recorded that he judged Israel as civil ruler all his life, going a yearly circuit from Ramah, where was his home, to Bethel, Gilgal, and Mizpeh. His administration was distinguished by the restoration of the neglected

worship of Jehovah. He also gave a new vigour to the theocratical institutions of Moses by the establishment of schools of the prophets. In his old age Samuel anointed Saul as king, and when Saul failed in his duties Samuel anointed a new king, David. He did not live to see the contest between David and Saul decided.

Samuel, BOOKS OF, in the Old Testament, are two in number in the modern editions of the Hebrew text. In Hebrew MSS. the work is one; the division into two books being first introduced by Bomberg, in 1518, at Venice. The contents of the books present us with a more or less consecutive narrative of events relating to the Israelites, from the priesthood of Eli to the death of David. The principal periods embraced in the record are:—the restoration of the theocracy under Samuel (book i. chap. i.–xii. B.C. 1171–1095); the history of Saul's reign, ending with his death (book i. chaps. xiii.–xxxi. B.C. 1095–55); and the history of David's reign (book ii. B.C. 1055–15). As regards the authorship of these books it is evident they could not have been written by Samuel, since his death is recorded in book i. chap. XXV.

Sana', a town in South-western Arabia, capital of Yemen, 170 miles N.N.E. of Mocha, situated in a valley 4000 feet above the sea. The streets are wide, and the town is encircled by a wall about 5 miles in circuit. There are many handsome houses, numerous fountains, two large palaces, many mosques, some of them with tall minarets, baths, caravansaries, and an aqueduct. The chief manufactures are articles in gold and silver, gunpowder, sword-blades, &c. The staple article of trade is coffee. Pop. 30,000.

San Antonio, or SAN ANTONIO DE BEXAR, a town in Texas, United States, on the San Antonio River, 80 miles south-west of Austin city. The principal public buildings are the hospital, orphan asylum, a Roman Catholic cathedral college and convent, arsenal, and schools. The town is a great centre of trade in wool, horses and mules, hides, and grain. There are several breweries, tanneries, and flour mills. It is one of the oldest Spanish towns on the continent, and has a large trade with Mexico. Pop. 37,673.

Sanatorium, a place to which people resort for the sake of their health, the term being specifically applied to military or civil stations on the mountains or table-lands of tropical countries, with climates suited to the health of Europeans.

San-beni'to, a kind of loose upper garment painted with flames, figures of devils, the person's own portrait, &c., and worn by persons condemned to death by the Inquisition when going to the stake on the occasion of an *auto de fe.*

San Carlos, a town of Venezuela, on the river of same name, a well-built thriving place. Pop. 10,741.

San Catal'do, a town of Sicily, prov. Caltanissetta, with sulphur mines. Pop. 15,105.

Sanchuniathon (san-kŭ'ni-a-thon), or SANCHONIATHON, a Phœnician historian and philosopher, who is supposed to have lived about 1250 B.C. Only fragments of his works remain, quoted by Eusebius from a translation into Greek by Philo of Byblos. Some modern critics have said that the fragments were forgeries, and it is now doubted by many whether he ever existed.

San Cristo'bal, town of Mexico, capital of the state of Chiapas, 450 miles E.S.E. of the city of Mexico. Manufactures earthenware and coarse textiles, but the chief occupation is cattle-raising. Pop. about 12,000.

Sancroft, WILLIAM, an English prelate, born in 1616. He was educated at the University of Cambridge, and obtained a fellowship in 1642, but was ejected because he refused to sign the 'engagement' to support the Covenant and the Presbyterian party. After the Restoration he became successively dean of York and St. Paul's, in 1668 archdeacon, and in 1678 archbishop of Canterbury. He was committed to the Tower in 1687 with six other bishops for refusing to read the Declaration of Indulgence, but they were all acquitted. On the Revolution settlement he became a nonjuror, and thereby forfeited his archbishopric. He was succeeded by Tillotson, and lived secluded till his death in 1693. Sancroft published some sermons, Modern Politics, and one or two other works of little permanent value.

Sanctification is the term applied in Scripture, as well as in theology, to denote the process by which the effaced image of God in man is restored, and the sinner becomes a saint. It is based upon the holiness of God, who communicates his purity to his people by means of the Holy Spirit. Sanctification is distinguished from justification in this, that while justification changes the state of the sinner in law before God as a judge, sanctification changes the heart before him as a father. Justification pre-

cedes sanctification; the one removing the guilt, the other the power of sin. The former is an act done at once, the latter is a gradual process.

Sanctuary, RIGHT OF, is the privilege attaching to certain places in virtue of which criminals taking refuge in them are protected from the ordinary operation of the law. By the Levitical law there were six cities of refuge for the involuntary manslayer, and a somewhat similar provision is traceable among heathen nations. From the time of Constantine downwards certain churches were set apart in many countries to be an asylum for fugitives from the hands of justice. During the middle ages the custom of sanctuary was much abused, the privilege being often extended to wilful malefactors. In England, particularly down to the time of the Reformation, any person who had taken refuge in a sanctuary was secured from punishment — except when charged with treason or sacrilege—if within the space of forty days he gave signs of repentance, and subjected himself to banishment. Sanctuaries were finally abolished in 1697 by 8 and 9 Will. III. cap. xxvii. In Scotland the Abbey and Palace of Holyrood, with their precincts, including Arthur Seat and the Queen's Park, have the privilege of giving sanctuary to civil debtors, but since the abolition of imprisonment for debt, the importance of this protection has ceased.

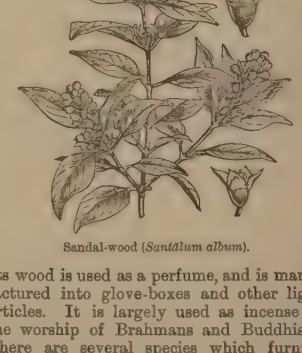
Sand, fine particles of stone, particularly of siliceous stone in a loose state, but not reduced to powder or dust; a collection of siliceous granules not coherent when wet. Most of the sands which we observe are the ruins of disintegrated rocks, and differ in colour according to the rocks from which they were derived. Valuable metallic ores, as those of gold, platinum, tin, copper, iron, titanium, often occur in the form of sand or mixed with that substance. Pure siliceous sands are very valuable for the manufacture of glass, for making mortar, filters, ameliorating dense clay soils, for making moulds in founding, and many other purposes.

Sand, GEORGE. See *Dudevant*.

Sanda, a small island of Argyllshire, Scotland. It lies S.S.E. of the Mull of Kintyre, and is about 1½ mile long and ½ mile broad. There is a lighthouse on the island. Pop. 36.

Sandal, a kind of shoe or covering for the feet used among the ancient Jews, Greeks, and Romans. It consisted of a sole fastened to the foot by means of straps crossed over and wound round the ankle. Originally made of wood, vegetable leaves or fibres, or leather, they afterwards became articles of great luxury, being made of gold, silver, and other precious materials, and beautifully ornamented. Certain religious orders of the present day wear sandals.

Sandal-wood (genus *Santălum*, natural order Santalaceæ), a tree belonging to the East Indies and the Malayan and Polynesian islands, remarkable for its fragrance.



Sandal-wood (*Santalum album*).

Its wood is used as a perfume, and is manufactured into glove-boxes and other light articles. It is largely used as incense in the worship of Brahmans and Buddhists. There are several species which furnish sandal-wood, the common being *S. album*. Some trees of other genera are called false sandal-wood. See also *Adenanthera*.

Sandal-wood Island, or JEENDANA, a large island in the Indian Archipelago belonging to the Dutch residency of Timor, crossed by the meridian of 120° E.; area, 4000 square miles; with a population of about 2–300,000. The coast is bold, and terminates at the southern extremity in a lofty and inaccessible peninsula. The interior is mountainous. Edible birds'-nests, bees'-wax, ponies, and sandal-wood are obtained here. The natives are of the Malay race.

Sandarach (san'da-rak), a resin which exudes from the bark of the sandarach-tree (which see). It is used as incense, and for making a pale varnish. It is also used as pounce-powder for strewing over paper erasures. Called also *Juniper-resin*.

Sandarach-tree (*Callitris quadrivalvis*), a large coniferous tree with straggling

branches, yielding the resin described in preceding article. It is a native of Morocco, Algeria, and Northern Africa generally. The timber is fragrant, hard, and durable, and is largely used in the construction of mosques and other buildings, as well as for cabinet work.

Sanday, one of the Orkneys, an island of very irregular shape, generally with a very flat surface and a light sandy soil; greatest length fully 13 miles. There are a number of small lakes. Pop. 1929. — There is another small island of same name in the Inner Hebrides, connected with Canna at low water, 4 miles N.W. of Rum. Pop. 62.

Sandbach (sand'bach), a market town of Cheshire, England, 4½ miles north-east of Crewe. It has a handsome church, a spacious grammar-school, and in the market-place are two antique obelisks. In the neighbourhood are salt-works. Pop. 5824.

Sand-blast, a method of engraving and cutting glass and other hard materials by the percussive force of particles of sand driven by a steam or air blast.

Sandbox-tree. See *Hura.*

Sand-crab, or RACING CRAB, a genus (*Ocypŏda*) of crabs, which live in holes in the sand along the sea-shores of warm countries. *O. cursor* inhabits the Mediterranean, Red Sea, and Indian Ocean, and is remarkable for the rapidity of its motions.

Sand-eel, a genus of teleostean fishes belonging to the sub-order Anacanthini. The body is slender and cylindrical, somewhat resembling that of an eel, and varying from 4 inches to about 1 foot in length, of a beautiful silvery lustre, destitute of ventral fins, and the scales hardly perceptible. There are two British species, bearing the name of launce, viz. the *Ammodȳtes tobianus*, or wide-mouthed launce, and the *A. alliciens* or *lancea*, the small-mouthed launce. They are of frequent occurrence on the British coasts, burying themselves in the sand to the depth of 6 or 7 inches during the time it is left dry by the ebb-tide, whence the former is dug out by fishermen for bait. They are delicate food. The common American species is the *A. americanus.*

Sandemanians, or GLASSITES, a sect founded by John Glass, a Scotchman, about 1728. He was originally a Presbyterian minister, but was suspended for holding heretical opinions. Amongst other views, he held that the church and state should be in no way connected, and that there should be no established church. These doctrines were much developed by his son-in-law, Robert Sandeman (born at Perth 1723, died in America 1771), who established the sect in London and America. He maintained that justification by faith meant nothing more than a simple assent to the divine mission of Christ. The Sandemanians still exist as a very small body, and have revived several customs of the primitive church, such as the kiss of charity, the use of the lot, and the weekly love-feasts.

Sander (*Lucioperca sandra*), a species of fishes belonging to the perch family, and found in fresh-water rivers and streams in Germany and the east of Europe generally. It attains an average length of from 3 to 4 feet, and is esteemed as an article of food. It is known under the name of pike-perch.

Sanderling (*Calidris arenaria*), a wading bird averaging from 6 to 8 inches in length, which breeds in the Arctic regions, and in winter migrates southwards. It feeds on small marine animals, and chiefly inhabits the sandy tracts of the sea-beach and the estuaries of rivers. The flesh is nutritious and pleasant to the taste.

Sanders-wood. See *Santal-wood.*

Sand-flea. Same as *Sand-hopper.*

Sand-flies (genus *Simulium*), the name of certain flies found in various countries, the bite of which may give rise to painful swellings. They are included in the family Tipulidæ, which also includes the well-known 'daddy long-legs,' or crane-flies.

Sand-grouse (*Pterocles*), a genus of rasorial or scratching birds, belonging to the family Pteroclidæ, and differing in several respects from the common grouse (which see), belonging to the family Tetraonidæ. They are natives chiefly of the warm parts of Asia and Africa, and are most abundant in arid sandy plains. The legs are longer than in other grouse, and the tail and wings are pointed. Pallas's sand-grouse differs from these in having feathered tarsi and united toes. It has been made the type of the genus *Syrrhaptes*, and is a native of the sandy plains of Central Asia, where it occurs in vast numbers. Much interest was excited in 1863, and again in 1888, by vast flocks of these birds invading Europe. They crossed the North Sea, and were found in considerable numbers throughout Britain and the Faroe Isles, and even bred in Britain in one or two cases.

Sand-hopper (*Talitrus locusta*), a species of small insect-like crustaceans of the order Amphipoda, common along most sea-shores,

where they may be met with leaping about the sands in great quantities after the receding tide.

Sand'hurst, a village in England, Berkshire, pleasantly situated on the Blackwater, and famous for its royal military college, originally founded at Great Marlow in 1802, but removed to Sandhurst in 1812. Here cadets who have passed by competition for the army receive a year's training in the theoretical part of military science.

Sandhurst (officially *Bendigo*), a flourishing city of Victoria, Australia, about 100 miles N.N.W. of Melbourne, an important railway and gold-mining centre. It contains a handsome pile of public buildings, fine town-hall, law courts, banks, hospital, benevolent asylum, mechanics' institute (with a library of 14,500 volumes), a theatre, numerous places of worship, botanic gardens, &c. It is lighted with gas and electricity, and well supplied with water. Besides gold-mining, which employs 4000–5000 miners, iron-founding and making of railway rolling-stock, coach-building, stone-cutting, tanning, vine-growing, &c., are carried on. Pop. 42,098.

San Die'go, a rapidly-rising seaport of Southern California, U.S., and a favourite resort of invalids, situated on a fine bay of the Pacific. Pop. 16,159.

San'diver, the scum of molten glass, used, when pulverized, as a polishing substance.

Sand-lance, or LAUNCE. See *Sand-eel*.

Sand-lizard (*Lacerta agilis*), a lizard found on sandy heaths in Great Britain. It is about 7 inches long, variable in colour, but generally sandy-brown on the upper parts, with darker blotches interspersed, and having black rounded spots with a yellow or white centre on the sides.

Sand-martin, or BANK-MARTIN (*Hirundo* or *Cotile riparia*), a bird included in the family of swallows, a summer visitant to Britain, where it is common in most localities. It is the smallest British member of its family, and is so named from its habits of nest-building in holes dug in the high banks of rivers, in the sides of sand or gravel pits, and in similar situations. The colour of the sand-martin is a soft brown on the head and upper parts, and white below, with a dark brown band on the chest.

San Domingo. See *Hayti, Dominican Republic*.

San Domingo (more properly SANTO DOMINGO), the capital city of the Dominican Republic, which includes the eastern part of the island of Hayti. The town is situated at the mouth of the Ozama on the south coast, and is the seat of the government and a bishop's see. It has spacious streets and squares, a cathedral dating from 1540, a university, &c. San Domingo is the oldest European city of the New World, and was founded by Bartholomew Columbus in 1496. Columbus was buried here in 1536; but his remains were removed to Havana in 1794. Pop. about 16,000.

Sand-paper is made in the same way as emery-paper, with the difference that sand is substituted for emery. See *Emery*.

Sand-pipers, a group of small grallatorial or wading birds, belonging to the family Scolopacidæ or snipes. These birds inhabit the shores of the sea and the estuaries and banks of rivers, and grope in the soft mud for the worms, small molluscs, insects, &c., upon which they feed. They migrate southwards in winter in flocks, and appear to moult twice a year, the summer plumage differing from the winter dress. The voice is shrill and unmusical; and they are able both to run and to fly with rapidity. The common sand-piper or summer-snipe (*Totănus hypoleucus*) visits Britain in summer, and is of a greenish-brown hue mottled with black. The green sand-piper (*T. ochropus*), on the contrary, leaves Britain for the north in summer. The little sand-piper or little stint (*Tringa minuta*), an Indian and South African bird, is occasionally seen in Britain. The purple sand-piper (*Tringa maritima*), a native of Greenland, Spitzbergen, &c., is also a summer visitant. The dunlin, knot, greenshank, and redshank are also known as sand-pipers. Sand-pipers of various species are abundant in North America, and in winter in the West Indies.

Sand-screw (*Sulcător arenarius*), a species of Crustacea, nearly allied to the sand-hoppers (which see), and so named from the tortuous manner in which it excavates its burrows in the sand.

Sand-star (*Ophiura*), a genus of star-fishes belonging to the order Ophiuroidea. In the sand-stars the arms or rays are mere appendages to the body, and not definite parts, and the viscera or organs of the body do not extend into the rays, but are confined to the central body-piece or 'disc.' The ambulacral system of vessels is not well developed, and does not subserve locomotion to the same extent as in the Asteroidea.

Sandstones consist usually of grains of quartz aggregated into a compact rock, which may also contain particles of felspar, minute scales of mica, and an admixture of clay, indicating in many places their immediate derivation from the debris of granitic rocks. Sandstones are in most cases chiefly composed of particles of quartz, united by a cement. The cement is in variable quantity, and may be calcareous or marly, argillaceous or argillo-ferruginous, or even siliceous. The grains of quartz are sometimes scarcely distinguishable by the naked eye, and sometimes are equal in size to a nut or an egg, as in those sandstones called conglomerates, or sometimes pudding-stone or breccia. The texture of some sandstones is very close, while in others it is very loose and porous. Some sandstones have a fissile structure, and have been called sandstone slate. In colour sandstone varies from gray to reddish-brown, in some cases uniform, in others variegated. In addition to quartz some sandstones contain grains of felspar, flint, and siliceous slate, or plates of mica. Some sandstones are ferruginous, containing an oxide or the carbonate of iron. Sandstones have been formed at different periods and under different circumstances, and are hence associated with different rocks or formations. They are in general distinctly stratified, and the beds horizontally arranged, but sometimes they are much inclined or even vertical. Sandstone in some of its varieties is very useful in the arts, and when it has no tendency to split is known by the name of *freestone*. When sufficiently solid it is employed as a building stone. Some varieties are used as millstones for grinding meal, or for wearing down other materials preparatory to a polish, and some are used for whetstones. For the *New Red Sandstone*, and the *Old Red Sandstone*, see *Geology*.

Sandus'ky, a city of Ohio, in the United States, on a sandstone ridge on the southern side of Sandusky Bay, Lake Erie, about 61 miles W. of Cleveland. The site rises gradually from the shore and commands a fine view of the bay. The principal public buildings are a court-house, a high school, and many churches. An extensive trade is done in fish, lumber, limestone, manufactured wood-work, grapes, and wine; and there are large machine-shops, steel-works, and engine and boiler works. It is celebrated for its manufacture of articles in bent wood; and its fisheries employ over 1000 hands. Pop. 18,471.

Sand-wasp, a name of hymenopterous insects of the genus *Ammophila*, belonging to a group which, from their peculiar habits, are termed *Fossores* or diggers. The sand-wasp inhabits sunny banks in sandy situations, running among grass, &c., with great activity, and continually vibrating its antennæ and wings. The female is armed with a sting.

Sandwich, a municipal borough and one of the Cinque Ports of England, in the county of Kent, on the Stour, 4 miles from the sea at Pegwell Bay, 78 miles E. of London by rail. The streets are narrow, and part of the old walls and one of the gates are still standing. It was made a Cinque port by Edward the Confessor, and was the royal naval port until the time of Richard II. It has an ancient guild-hall, and a parish church in the early Norman style. The place has a considerable trade, and carries on brewing, malting, tanning, &c. The harbour, long neglected, has been improved, and now admits vessels drawing 10 feet. Sandwich returned two members to parliament until 1885, when it was disfranchised; the parliamentary borough included Deal, Walmer, Ramsgate, &c. Pop. of municipal borough, 2796.

Sandwich, the name given to an article of food consisting of a slice of meat, fish, fowl, or other savoury food placed between two slices of bread, which may be plain or buttered. The term is said to have arisen from an earl of the name having been in the habit of providing himself with one in his pocket to avoid dining in town.

Sandwich Islands, or the HAWAII GROUP, a cluster of islands, thirteen in number, situated in the North Pacific; total area, 6677 square miles. Five of them are mere islets; all the other eight are inhabited, but only four are of considerable size. They are generally of volcanic origin, and mountainous, with many lofty summits, of which Mauna-Kea on Hawaii is 13,953 feet high. Mauna-Loa (13,760 feet), another peak on the same island, is a volcano still active; the last eruption took place in 1887. The surface of the islands is generally rugged, but there are many fertile valleys. The coasts are for the most part precipitous and lofty, and have few good harbours. Hawaii, the largest island, has an area of 4372 square miles, with 26,754 inhabitants. The second largest is Maui, consisting of two peninsulas connected by a low isthmus; area, 488 square miles; pop. 17,357. The chief island is Oahu;

area, 647 square miles, pop. 31,194. Honolulu, the capital and chief port of the islands, is situated on Oahu. The remaining large islands are Kauai and Niihau, with an area of 657 square miles, and 11,859 inhabitants. The island of Molokai is a leper colony. The inhabitants of the group belong to the light-coloured Oceanic stock, and have been civilized and converted to Christianity. The islands are now officially designated as the Republic of Hawaii, the former monarchical government having been overthrown in 1893. The legislature consists of a senate of fifteen members elected for six years, and a chamber of representatives of fifteen members elected for two years. The head of the government is a president, elected for six years by the two houses voting together, and he is assisted by a council of state. The former government was a constitutional monarchy, under a native ruler (latterly Queen Liliuokalani). There are several high-class and numerous elementary schools. All religions are tolerated. Railways have been built on Hawaii, Oahu, and Maui. Honolulu, the capital, has become an important entrepôt, and in it almost the whole trade of the islands is centred. The chief exports are sugar, rice, coffee, bananas, tallow, and hides; the imports are chiefly manufactured goods, provisions, grain, and timber. The exports in 1895 were valued at nearly £1,700,000, and the imports at fully £1,000,000. The currency is mostly that of the United States. The standing army consists of some 500 men. The islands were discovered by Cook in 1778, who afterwards lost his life on Hawaii. Estimated pop. in 1896, 107,000, 75,000 being natives.

Sand-worms, a name applied to many members of the Annelida or worms, which inhabit the sand of the sea-coast. See *Lob-worm*, *Sabella*, &c.

Sandy Hook, a low sandy peninsula at the entrance of New York harbour. See *New York*.

Sandys (san'dis or sandz), Edwin, Archbishop of York, was born 1528, and educated at Cambridge University, where he became master of Catherine Hall and subsequently vice-chancellor of the university. Being a partisan of Lady Jane Grey he was imprisoned in the Tower; but he was liberated at the end of four months, and crossed to Germany. On the accession of Elizabeth he returned to England, and was made bishop of Worcester in 1559. In 1570 he was translated to London, and thence to York in 1577. He died in 1588.—His son, Sir Edwin Sandys (born 1561, died 1629), was employed by James I. on several missions, received the honour of knighthood, was connected with the Second Virginia Company and otherwise with the American colonies, and published Europæ Speculum, a Survey of the State of Religion in the Western Parts of the World.—Another son, George Sandys (born 1577, died 1644), published a Relation of Travels in the East, a metrical translation of Ovid's Metamorphoses, metrical paraphrases of the Psalms, Job, Ecclesiastes, Song of Solomon, &c. His poetry is praised by Dryden and Pope.

San Fernando, or Isla de Leon, a strongly fortified town of Andalusia, Spain, 7 miles south-east of Cadiz, situated on a flat in the Isla de Leon. The town is of modern construction, and has two hospitals, several convents, a marine school, an observatory, and an extensive arsenal. Salt, the staple trade of the town, is made in the *salinas* and marshes between San Fernando and Cadiz. Pop. 27,000.

Sanford, city of Lake co., Florida, on the south side of Lake Munroe, an expansion of the St. John River. It is a rapidly increasing place and important railway centre. Pop. 2500.

San Francisco, the chief town and seaport of California and of the western coast of North America, on the north-east corner of a peninsula which lies between the bay of San Francisco and the Pacific Ocean. The streets are straight, and intersect each other at right angles. The busiest streets are paved with stone, but most of the other streets are planked. The town is lighted with gas and electricity; water is brought from a distance of 20 miles. There is a public park of 1050 acres. Among the principal buildings are the custom-house, city-hall, mint, marine hospital, merchants' exchange, California bank, Nevada bank, several theatres, numerous churches, the mercantile library (with 50,000 volumes), the mechanics' institute, a school of design, and two medical colleges. The city is remarkable for its huge hotels. Cars worked by underground cables run through most of the streets. The houses are generally built of wood and finished with cement. San Francisco is a gay city, and is the 'Paris' of the Pacific coast of the United States. One quarter of the town is occupied exclusively by Chinese. Manufacturing establishments include sugar-refineries, woollen and silk

mills, manufactories of watches, boots, carriages, furniture, acids, iron and brass ware, silver goods, &c. A great traffic has grown up in the development of the grain and fruit resources of California. The city ranks as the third port of the Union and is directly connected by railway with the Eastern

States. The exports and imports together in 1895 amounted to £14,438,000. The Southern Pacific Railway enters the city, and also has a terminus at Oakland, to which ply ferries. The climate is generally healthy and temperate. The harbour or bay of San Francisco is one of the finest on the Pacific coast. It communicates with the ocean by a strait 5 miles long and 1 mile wide, called the Golden Gate. On the bar there is 30 feet of water at low tide, while within there is a much greater depth and good anchorage. It extends in a S.E. and N.W. direction for about 50 miles (including San Pablo Bay), and has a width of from 7 to 12 miles. San Francisco in 1847 had only a population of some 500. In 1848 gold was discovered, and a rush took place, which had raised the population in 1852 to 34,870. Between Dec. 24, 1849, and June 22, 1851, five fires occurred in the town, which occasioned an aggregate loss of £3,200,000. In 1860 the population was 55,626; in 1870, 149,473; and in 1880, 233,959, of whom 20,000 were Chinese; in 1890 it had risen to 298,997.

Sangallo, ANTONIO, Italian architect, born in the environs of Florence in 1485. He succeeded his master Bramante as architect of the church of St. Peter's in Rome, and was much employed under the popes Leo X., Clement VII., and Paul III., both in fortifying places and in the construction of public buildings, the grandeur and solidity of which have been much admired. He died in 1546. His two uncles, Antonio and Giuliano Sangallo, were also distinguished architects.

Sangerhausen (zäng'ér-hou-zn), a town of Prussian Saxony, 33 miles W.N.W. of Merseburg, on the Gonna. The town has two castles, and manufactures of iron-ware, machinery, &c. Pop. 10,070.

San Giovanni (jo-vän'nē), a town of S. Italy, on the Bay of Naples. Pop. 14,397.

Sangir Islands (sän'gēr), a group of small islands in the Indian Archipelago, situated between the N.E. extremity of Celebes and the Philippine isle of Mindanao. Most of them are inhabited and are covered with cocoa-palms. Rice, pisang, and sago are cultivated. The islands are all mountainous and partly volcanic. In an eruption of Awu, a volcano on Great Sangir, in March 1856, nearly 3000 of the inhabitants perished; and a visitation almost as serious occurred in June 1892. The natives are of the Malay race, and profess Christianity. The islands belong to the Netherlands. Pop. about 50,000.

Sangraal. See *Grail.*

Sanguinaria. See *Blood-root.*

Sanhed'rim, or SANHEDRIN (corrupted from the Greek *sunedrion,* a council), the supreme judicial tribunal of the Jews, existing in the time of the Maccabees and in New Testament times. According to the Talmud it was founded by Moses when he elected seventy elders to assist him in judging the children of Israel in the wilderness, but this view is now generally rejected. The sanhedrim consisted of seventy members besides the president, who was usually the high-priest. They were chosen from among the priests, elders, heads of families, and scribes or doctors of law, and had power to deal with both secular and spiritual matters. At the trial of our Lord they sat in the palace of the high-priest. The council became extinct in 425.

Sanitary Science teaches how to maintain health and to ward off disease, and treats more especially of what is required of each individual in his duty to his neighbour, so that by using such means as may ensure his own health he may in a negative

way preserve that of his neighbour also. The subject naturally divides itself into four main divisions:—1. That relating to our dwellings; 2. Food; 3. Clothing; 4. Cleanliness. As regards the first head, our dwellings should be situated so as to ensure a free circulation of air round them, and a thorough system of drainage. The rooms should be large, airy, and well ventilated. A most pernicious source of impurity is sewer-gas, which can only enter houses where waste and soil-pipes are in direct communication with the main system of sewers. The decomposition of fæcal and other matters in drains produces both ammoniacal and other sulphurous gases. These gases, owing to their light specific gravity, rise to the highest point in the pipes, and from thence force their way through imperfections in drains and pipes, and also through the water-traps of closets, sinks, &c., into our houses, and become a most potent atmospheric impurity. They are of two kinds—an odoriferous and an odourless gas. The former is almost innocuous, but the latter is most deadly, since it depresses the general system and frequently contains the germs of disease. Sunlight and thorough ventilation destroy the properties of this gas. In order to prevent sewer-gas from entering a house, all waste-pipes in connection with the sewers should be carried along outside the house and furnished with a ventilator, so that the gas may escape into the external air. The ventilator should discharge at the roof of the house, and not near to a window or other opening into the dwelling. The outlet of pipes from wash-basins in bedrooms should discharge in the open air, and should not be directly connected with drains. Foul smells and gases arise from many other causes, such as decomposition of organic matter within the house, emanations from the surface of the body, preparations of arsenic and copper in wall-paper, &c. Flowers also give off carbonic acid gas at night, and gas-jets also pour much impurity into the atmosphere. Overcrowding also greatly vitiates the atmosphere. Thorough drainage of our houses is also very necessary in order to prevent dampness, which is a most prolific source of disease. Every portion of a house should be kept scrupulously clean, and after infectious or contagious disease there should be a thorough cleansing and disinfecting of the furniture, bedding, carpets, &c. As regards food and clothing enough has already been said in the articles *Dietetics* and *Clothing* (which see). A few words require to be said, however, on the last division of the subject—that of cleanliness. The neglect of an efficient use of cold water is perhaps one of the most potent and prolific causes of disease. The first duty of every human being is to attend thoroughly to the cleansing of the whole body, and this can only be done by the free application of water. The daily use of a cold bath is not only conducive to health, but a powerful preventive against disease. It is always desirable when we leave a bath that a glow—called the reaction—should be felt all over the body, and this can be assisted by the vigorous use of a rough towel. Bathing in this way is a powerful natural tonic to the skin, nerves, and muscular system. It promotes digestion, regulates the bowels, and is in fact invaluable as a sanitary measure. All underclothing should be changed at least once a week; and socks and stockings every two days. All household furnishings should be kept thoroughly free from dirt. One or two other points should also be noticed. Exercise is one of these. It may be walking or horse exercise. Both are invigorating; both promote appetite and digestion and the healthy action of the functions generally. An outdoor occupation is to be preferred on the score of health. In addition, freedom from anxiety, cheerful society, honesty, and the practice of all the virtues are most conducive to the promotion and preservation of health. See also *Germ Theory of Disease, Disinfectant, Public Health Acts*, &c.

Sanjak (Turkish, 'a standard') is the name given to a subdivision of an eyalet or minor province of Turkey, from the circumstance that the governor of such district is entitled to carry in war a standard of one horse-tail.

San Joaquin (*hō-à-kēn'*), a river of California which traverses the valley of the same name from the Tulare Lakes, joins the Sacramento, and falls into Suisun Bay. It has a length of 350 miles.

San José (*hō-sā'*), a city of the United States, capital of Santa Clara county, California, in the valley of Santa Clara, 46 miles by rail S. of San Francisco. The city is embowered in trees and shrubberies, and has a fine park, 6 miles distant, to which leads a beautiful avenue of trees. It contains a court-house, a theatre, state normal school, public halls, a public library, and other good public buildings. Wheat, wine,

dried and canned fruits, tobacco, &c., are produced here. Pop. 18,060.

San Jose, capital of the state of Costa Rica, Central America. It stands on a table-land 4500 feet above the sea-level. The streets are narrow, and there are few public buildings worthy of note. It is the centre of the trade of the state. The climate is healthy, and the town is surrounded with coffee-plantations. Pop. 25,000.

San Juan (*hụ-ân'*), the name of a number of towns in what is or was Spanish America. 1. S. J. DE LOS LAGOS, in the Mexican state of Jalisco. Pop. 18,644. 2. S. J. DE LOS REMEDIOS, in Mexico, state of Durango. Pop. 7800. 3. S. J. DEL RIO, in Mexico, state of Querétaro. Pop. 10,000. 4. S. J. DE LA FRONTERA, a town of the Argentine Republic, capital of the province of San Juan. It has a cathedral, a school of mines, botanic garden, &c. Pop. 15,000. —The province is bounded on the west by the Andes. Area, 29,700 square miles; pop. 125,000. The climate is dry and warm, and the country fertile. It contains rich gold and silver mines. Wheat is extensively cultivated. In the south-east of the province is the large Lake of Guanacache. See also *Porto Rico* (*San Juan de*) and *Greytown*.

San Juan, a river of Central America, which carries the water of Lake Nicaragua to the Caribbean Sea. See *Nicaragua*.

San Juan Boundary Question. By the Treaty of Washington (15th June, 1846) it was provided that the boundary line between British North America and the United States should be continued to the middle of the channel between Vancouver's Island and the continent, and thence south to the Pacific Ocean. But the island of San Juan lies in the middle of this channel, and the question immediately arose to whom the island should belong. It was a subject of long and bitter dispute, but at last the matter was submitted to the arbitration of the Emperor William of Germany without appeal. The emperor's award, dated October 21st, 1872, was given unreservedly in favour of the American claim, on the ground that the American view of the treaty of 1846 was the more correct one.

Sānkhya (Sanskrit, numeral or rational), is the name of the chief philosophical system of India. Its doctrines are attributed to the sage Kapila, fabled to have been a son of Brahma and an incarnation of Vishnu. It teaches the eternity of matter and spirit independent of a Supreme Being, and propounds a code of twenty-five principles, by the observance of which eternal happiness or complete exemption from every kind of ill can be obtained. Sānkhya philosophy is supposed to date from a period anterior to the 8th century B.C.

San Lucar-de-Barrameda, a seaport of Spain in Andalusia, at the mouth of the Guadalquivir, in a sandy, treeless district, 18 miles north of Cadiz. There is a considerable trade, especially in wine. Magellan embarked here in 1519 on his first voyage. Pop. 22,777.

San Luis, a province of the Argentine Republic. Area, 23,359 square miles. The climate is healthy, and rain seldom falls. The province is rich in copper and other metals. The leading industry is cattle-rearing. Pop. 100,000.—The chief town is SAN LUIS DE LA PUNTA. It consists chiefly of mud huts surrounded by mimosa thickets. A trade is done in cattle and hides. Pop. 7000.

San Luis de Potosi (pot-o-sē'), a city of Mexico, capital of the state of same name, 198 miles N.W. of Mexico, 6350 feet above sea-level; regularly built, with fine streets. It has a handsome cathedral; manufactures of clothing, shoes, hats, &c.; railway workshops; and a considerable trade. Pop. 62,573.—The state has an area of 27,500 sq. miles, is generally fertile, and has rich gold and silver mines. Pop. 516,486.

San Marco in Lamis, a town in the province of Foggia, Italy. Pop. 15,579.

San Marino. See *Marino*.

San Miguel (mi-gel'), a town of Mexico, state of Guanajuato, on the Rio de la Lara, with manufactures of woollens, saddles, weapons, &c. Pop. 39,290.

Sannaza'ro, JACOPO, Italian poet who wrote both in Latin and Italian, born at Naples 1458, died 1533. He was patronized by King Ferdinand of Naples and his sons Alphonso and Frederick, and the latter gave him the delightful villa of Mergellina, with a pension of 600 ducats. Sannazaro wrote sonnets and *canzoni* and an idyl (Arcadia) in Italian, Latin elegies, eclogues, epigrams, and a longer poem, De Partu Virginis, in three books.

Sanquhar (sang'kėr), a parliamentary and municipal burgh in Dumfriesshire, Scotland, 26 miles N.N.W. of Dumfries, a short distance from the Nith. It unites with Dumfries, &c., in sending a member to parliament. Pop. 1315.

San Remo, a town in the province of Porto-Maurizio, Italy, on the Gulf of Genoa. It is noted as a climatic health resort, and is situated in a beautiful district. The old town is small and badly built. The new town contains many beautiful villas, and is frequented in winter by persons suffering from chest affections. Pop. 16,189.

San Roque (rō'ke), a town of S. Spain, near the peninsula of Gibraltar. Pop. 8729.

Sans, town of Spain, prov. Barcelona, with cotton spinning and weaving works, &c. Pop. 15,959.

San Salvador, a town in Central America, capital of the state of Salvador, situated near the volcano of same name. The inhabitants are chiefly engaged in agriculture. The town was completely destroyed by earthquake on April 16th, 1854, and has suffered severely since. It was founded originally in 1528. Pop. 16,327.

Sansan'ding, a town in Segu, Western Soudan, Africa, on the left bank of the Niger. It is now in territory over which France claims a protectorate. It had recently a pop. of about 40,000.

Sans-Culottes (sân-kû-lot; Fr., 'without breeches'), the name given in derision to the Jacobins or popular party by the aristocratical in the beginning of the French revolution of 1789, and afterwards assumed by the patriots as a title of honour.

San Sebastian, a city and seaport in the north-east of Spain, capital of the province of Guipuzcoa, partly on the side of Mount Orgullo, which projects into the Bay of Biscay, and partly on the isthmus connecting it with the mainland. It was once strongly fortified, its fortifications including the castle of Mota on the summit of Orgullo, 493 feet high. The town, which was destroyed by the English in 1813, consists for the most part of modern houses arranged in spacious streets and squares. The manufactures consist chiefly of cordage, sail-cloth, leather, candles, and soap. The harbour is small, exposed, and difficult of access, and the trade has greatly decayed; but the place is much frequented for sea-bathing. San Sebastian is of considerable antiquity, and having by its early fortification become the key of Spain on the side of France figures much in all the wars between the two countries. In 1813, when held by the French, it was stormed by the British. Pop. 29,047.

San Seve'ro, a flourishing town of Southern Italy, in the province of Foggia, 39 miles E.N.E. of Campobasso. It is tolerably well-built, and contains a cathedral. Pop. 19,756.

Sansevie'ra. See *Bowstring-hemp*.

Sanskrit Language and Literature. Sanskrit is the name given to the learned and classical language of the Hindus, the language in which most of their vast literature is written, but which has not been a living and spoken language since about the 2d century before Christ. It is one of the Aryan or Indo-European family of tongues, and may be described as a sister of the Persian, Greek, and Latin, Teutonic, Slavonic, and Celtic tongues. It stands in the same relation to the modern Aryan languages of India as Latin stands to the Romance languages. It is a highly inflected language, having in this respect many resemblances to Greek. To philologists it has proved perhaps the most valuable of tongues, and it was only after it became known to Europeans that philology began to assume the character of a science. Its supreme value is due to the transparency of its structure, and its freedom from the corrupting and disguising effect of phonetic change, and from obliteration of the original meaning of its vocables. The name Sanskrit means carefully constructed or symmetrically formed, and was given to distinguish it from the vernacular dialects, which were called *Prākrit*, that is, common or natural. It is probable that Sanskrit, in its more highly elaborated form, was never spoken by any great body of the people. The alphabet is usually known as the *Nāgarī* or *Deva-Nāgarī*, and in its earliest form dates back several centuries before Christ. It consists of fourteen vowels and diphthongs, and thirty-three consonants, besides one or two other characters. Among the phonetic peculiarities of Sanskrit may be mentioned the absence of *f* and the existence of consonants such as *kh*, *gh*, *th*, *dh*, in which the *h* is distinctly heard after the other sound. When several consonants come together they are fused into one compound character in which the original components are often hard to distinguish. In Sanskrit roots play a most important part, the processes of declension and conjugation being looked upon as consisting in the appending of certain terminations to root-forms, or roots modified in certain ways to form inflective bases. The system of case-terminations is similar to those in Latin and Greek, but in declensional forms Sanskrit is richer than either of those languages. There are eight cases—

nominative, accusative, instrumental, dative, ablative, genitive, locative, and vocative. There are three numbers—singular, dual, and plural—and three genders. The verb in Sanskrit exhibits many striking analogies to the verb in Greek, but it is not so rich in forms. Prepositions are scarcely used in Sanskrit to govern nouns, as in other Aryan languages, but as prefixes to verbs they are of constant occurrence. Syntax holds but an unimportant place in Sanskrit grammar. The excessive use of cumbrous compounds —some of them of extraordinary length and complexity—is a very general feature in Sanskrit, appearing in all styles of composition, but especially the more artificial.

Sanskrit literature covers a period extending from at least 1500 B.C. to the present time. The great mass of the literature is in metre, even works on science and law having a poetical form. The oldest literary monuments are the Vedas—the Rig, the Yajur, the Sama, and the Atharva Veda. They are looked upon as the source of all the *shāstras* or sacred writings of the Hindus, which, however, include works upon ethics, science, and philosophy as well as religious works. (See *Veda.*) The *Purānas* form another important department of the religious literature, but are very much later than the Vedas. There are eighteen of them altogether, forming a vast body of literature of varied contents, the subjects treated comprising mythology, legendary, history, cosmogony, with many digressions of a philosophical and didactic nature, though some of them also contain descriptions of places, and pretend to teach medicine, grammar, &c. The oldest law-book is the Dharma-Shastra, ascribed to the mythical personage Manu. In the department of epic poetry the chief productions are the epics called the Rāmāyana and the Mahābhārata. The Rāmāyaṅa is believed to be the older of the two, and to have been current in India as early as the 5th century B.C. The Mahābhārata is a huge epic of about 220,000 lines, forming rather a cyclopædia of Hindu mythology, legendary history, and philosophy than a poem with a single subject. It is the production of various periods and various authors. (See *Ramayana, Mahabharata.*) In the province of lyric poetry we meet with poems of the greatest elegance, tender sentiment, and beautiful descriptions of nature. We must mention in particular the Meghadūta (Cloud Messenger) of Kālidāsa; the Ritusanhāra (Circle of the Seasons) of the same poet; and the Gitagovinda of Jayadeva, describing the adventures of Krishna. Though the Hindus can boast of some excellent specimens of dramatic poetry, yet, on the whole, their dramas are much inferior to those of the Greeks or of modern Europe. The plays are written in mixed prose and verse, and the lower characters and all females are made to speak not in Sanskrit but in Prākrit, only the higher male characters using the former. The Hindu poetic tales and fables have exercised a most important influence on the whole literature of the East, and even on that of our own middle ages. Among the collections of this class are the Panchatantra (Five Books), from which Europe derived the fables of Bidpai (or Pilpay) and the Hitopadesha (Salutary Instruction), a somewhat later collection of the same materials; also the twenty-five Tales of the Demon, seventy Tales of the Parrot (which gave rise to the well-known stories of the Seven Wise Masters), &c. The Kathā-sarit-sāgara (Ocean of Streams of Narration) compiled in the 11th century, is an extensive collection of the best Indian tales. The scientific literature of India is likewise large. Grammar seems to have had a special fascination for the Hindus. The oldest extant grammar is that of Pānini, which belongs to the 2d or 3d century before Christ. In mathematics and astronomy the Hindus have greatly distinguished themselves, as also in medicine and philosophy. Sanskrit literature was first introduced to the Western world by Sir William Jones in the end of last century.

Sans-souci (sāṅ-sō-sē; French, 'without care'), a palace near Potsdam built for Frederick the Great in 1745–47, mainly interesting for the relics of Frederick which it contains, and for its associations.

Santa Anna, ANTONIO LOPEZ DE, Mexican president, born 1798, died 1876. He took a prominent part in the expulsion of the Spaniards from Mexico, and proclaimed the Mexican Republic in 1822. He was in the front during all the Mexican troubles till 1833 when he became president. In 1836 he was defeated and taken prisoner by the Texans, but returned the following year. He was again president in 1846, but on the taking of Mexico by the U.S. troops in 1847 he resigned. He again held the office in 1853–55; was banished in 1867, but permitted to return in 1874.

Santa Catharina, a maritime state of Brazil, in the south; area, 27,436 square

miles. It is watered by numerous streams, the soil is fertile, the climate mild, and the seasons regular. Sugar, coffee, rice, maize, mandioca, and wheat are the chief cultivated products. Agriculture and cattle-rearing are the chief industries. There are a number of German settlements, the inhabitants of that nationality being reckoned at 70,000. The capital is Desterro. Pop. 236,346.

Santa-Clara. See *Abraham à Santa Clara.*

Santa Cruz. See *Sainte Croix.*

Santa Cruz, capital and chief port of the Canary Islands on the N.E. coast of Teneriffe. The streets are well paved, but the houses are small, and the public buildings few. There is an excellent harbour protected by a mole, and the coast is defended by a number of forts. Wine, brandy, and cochineal are the chief exports. Pop. 15,000.

Santa Cruz de la Sierra, capital of the department of Santa Cruz in Bolivia, situated on the banks of a small tributary of the Piray. The houses are built of earth and timber with large balconies. Pop. about 10,000.

Santa Fé, a town of the United States, capital of the terr. of New Mexico, in the northern part of which it is situated, 20 miles E. from the Rio del Norte, 7044 feet above the sea. The houses are partly built of unburned brick, but there are now some good buildings, including a state-house, Roman Catholic cathedral, hospital, and orphan asylum, &c. It is the centre of a considerable mining industry, and is a resort for persons suffering from pulmonary complaints. Pop. over 10,000.

Santa Fé, a town of the Argentine Republic, capital of the province of same name, situated at the confluence of the Salado with the Paraná, 230 miles N.N.W. of Buenos Ayres, on an unhealthy site. It is the seat of a bishop, has a cathedral, Jesuits' college, &c. The principal trade is in hides and timber. Pop. 15,099.

Santa Fé de Bogotá. See *Bogotá.*

Santala'ceæ, a natural order of apetalous exogenous plants. They are shrubs or herbs, with opposite or alternate exstipulate leaves, and a one-celled ovary with dry or fleshy albumen. In the form of weeds the genera are found in Europe and North America; in Australia, the East Indies, and the South Sea Islands they exist as large shrubs or small trees. *Santălum*, sandal-wood, is the chief genus.

Santal' Parganas, The, a district in the Bhagalpur division of Bengal; area, 5456 sq. miles. The Ganges, which bounds the district on the north and partly on the east, forms also its chief drainage. Various minerals, as coal, iron, and silver, have been found in this district. Pop. 1,754,196. The district is named from the Santáls, who form the most characteristic portion of its inhabitants, and are also found elsewhere in India. They are one of the aboriginal races belonging to the Dravidian stock, are dark-coloured, and mostly profess a religion of their own, in which the worship of a chief deity and subordinate deities and a sort of ancestor worship play a chief part. They live chiefly by hunting, and are exceedingly fond of flute-playing, dancing, and singing.

Santa Lucia. See *Lucia* (*St.*).

Santal-wood, a dye-wood obtained from *Pterocarpus santalīnus*, a leguminous tree of the East Indies, Madagascar, &c.; also called sanders or saunders wood and red sandal-wood. *Santaline*, a substance obtained from it, is used in dyeing blue and brown.

Santa Maria di Capua-Vetere, a town of South Italy, in the province of Caserta, 3 miles south-east of Capua. It is built on the site of ancient Capua, of which there are many remarkable ruins, including remains of a Roman amphitheatre. Pop. 18,470.

Santa Maura. See *Leucadia.*

Santander', a city and seaport of N. Spain, capital of the province of same name, on the Bay of Biscay, with a good and secure harbour. In the more ancient quarter the streets are narrow and straight, while in the modern the streets are spacious, and the houses of good architecture. There is a town-house, small cathedral, theatre, two public markets, promenades, &c. It has a large cigar manufactory, foundry, brewery, cooperages, fish-curing establishments, tanneries; besides manufactories of refined sugar, candles, vermicelli, hats, &c. It is also a resort for sea-bathing. Pop. 41,870. —The province is bounded by Biscay, Burgos, Palencia, and Oviedo, and has an area of 2111 square miles. The soil is fertile, and produces large quantities of maize, hemp, flax, oranges, lemons, figs, &c. There are also lead, coal, and iron mines, quarries of limestone and marble. The rearing of cattle is common, and the fisheries along the coast are well developed. Pop. 246,990.

Santarem (sản'tà-reṇ), a city of Portugal, beautifully situated in the province of

Estremadura, on the right bank of the Tagus, 46 miles north-east of Lisbon. It has interesting churches and an important Jesuit seminary. Pop. 7862.

Santee, a navigable river formed in South Carolina by the Congaree and Wateree rivers, which, after a course of about 150 miles, enters the Atlantic Ocean.

Santerre (sàn-tār), ANTOINE JOSEPH, born in Paris 1752, died 1809. As a wealthy brewer he was notable during the French revolution for his influence over the Parisian mob in the attacks on the Bastille and the Tuileries. He rose to be commander of the National Guard and a major-general.

Santia'go, the capital of the Republic of Chili and of the province of the same name, is beautifully situated at the foot of the Andes, 112 miles by rail E. of Valparaiso. It is intersected by the Mapocho, a rapid stream issuing from the Andes, has water channels in many of the streets, is lighted by electricity, and furnished with tramways. Owing to the prevalence of earthquakes the houses are mostly of one story, and generally occupy a large space of ground, having gardens and patios or courts in the interior. The Plaza or Great Square is a large open area adorned with a fine fountain; around it are the municipal buildings and criminal courts, the post-office, the old palace, formerly the residence of the presidents, now used as barracks, the cathedral, &c. There are also a mint, a well-appointed university with about 1000 students, high class secondary schools, school of art, military school, normal schools, theatre, museum, &c. The city was founded in 1541. The most memorable event in its history was the burning of a church, in which about 2000 persons perished, in 1863. Pop. 336,447.

Santiago-de-Compostella, a city of Spain in Galicia, in the province and 32 miles south of Coruña. It is picturesquely situated, and well built; streets for the most part broad and paved. The chief edifice is the cathedral, a Romanesque building founded in 1078, having in one of the chapels the image of St. James (Santiago) of Compostella (more correctly Compostela), which has long attracted numerous pilgrims. Other buildings are the archiepiscopal palace, the ecclesiastical seminary, the town-house, the convent of St. Martin, and the university. The town has manufactures of leather, linen, &c. Pop. 24,192.

Santiago-de-Cuba, a seaport town on the south-east coast of the Island of Cuba. It is the oldest town of the island (having been founded in 1514), is the see of an archbishop, has a fine cathedral, several other churches, and a harbour, which, though difficult of access, is spacious and deep. Its trade is considerable. Pop. 71,307.

Santiago del Este'ro, a town of the Argentine Republic, in the province of same name, in a fertile district on the Rio Dulce. Pop. 10,000.—The province has an area of 31,500 sq. miles, and is well suited for cattle-rearing and agriculture. Pop. 160,000.

San'tipur, a town in Nadiya district, Bengal, on the river Hooghly. It is well-known for its cloth manufactures, has an annual fair which lasts for three days, and a considerable local trade. Pop. 30,437.

Santley, CHARLES, a public singer, was born at Liverpool in 1834; acquired a knowledge of his art in Italy under Gaetano Nava, and in London under Garcia; appeared for the first time in 1857, and achieved his first great success at the Handel Festival in the Crystal Palace in 1862. Since then he has appeared constantly at oratorios, concerts, and operas as a baritone of great compass and finished expression.

Santo Domingo. See *San Domingo* and *Dominican Republic.*

San'tonin, SANTONINE ($C_{15}H_{18}O_3$), a proximate principle, possessing acid properties, obtained from the seed of southernwood (*Artemisia santonica*). It is colourless, crystallizable, and soluble in alcohol, and in the fixed and volatile oils, and is one of the most efficacious vermifuges.

San'torin, THERA, or CALLISTE, the largest of a small group of islands in the Grecian Archipelago, 60 miles north of Crete. It is somewhat crescent-shaped, and has a circuit of about 30 miles, though its breadth nowhere exceeds 3 miles. The shores of the inner curve are precipitous, but they slope gradually down to those of the outer curve, which are covered with vineyards. Wine is the staple of the island. The island is of volcanic origin, and adjoining it are several small islands thrown up by eruptions in historic times, the last having taken place in 1866. Pop. about 13,000.

Santos, a city and seaport of Brazil, in the state and 50 miles S.S.E. of São-Paulo, on the South Atlantic, in an unhealthy locality. The harbour is the best in the state, and the chief outlet for its products, which are coffee, sugar, tobacco, hides, &c. Pop. about 20,000.

São-Francisco (sâ-u̯n-), a river of Brazil, which rises in the south-west of the state of Minas-Geraes, flows N.N.E. through that state, and also the state of Bahia, forms the boundary between the latter state and Pernambuco, and falls into the Atlantic 50 miles N.N.E. of the town of Sergipe-del-Rey; length, 1600 miles, with numerous rapids and cataracts, which make its continuous navigation impossible.

Saône (sōn; anc. *Arar*), a river of E. France, rises in the Vosges, enters the department of Haute-Saône, then flows through the department of Côte-d'Or, continues south-west and receives the Doubs as tributary, reaches Châlon, where it flows due south until it joins the Rhone at Lyons; length, 280 miles, of which 190 are navigable. It is connected by canals with the Rhine, Loire, and Seine.

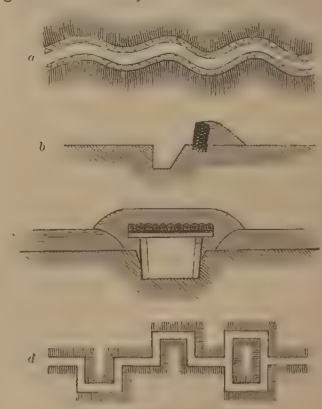
Saône, Haute (ōt sōn; 'Upper Saône'), a department in the east of France; area, 2028 square miles. It is drained by the Saône, the Ognon, &c., and there are many small lakes. A part of the department belongs to the Vosges Mountains. This, which comprises about a fourth of the whole, is rugged and the soil arid, but the low-lying basin is well watered and productive. In addition to cereals flax and hemp are extensively cultivated; the ordinary fruits generally thrive well, and some districts are almost covered with cherry plantations. Iron is extensively worked, but the main occupation is agriculture. Vesoul is the capital. Pop. 290,954.

Saône-et-Loire (sōn-é-lwär), a department of E. France; area, 3270 square miles. It is divided by a mountain range, which belongs to the Cevennes, and it takes its name from the two streams which bound the department on the south-east and west respectively. The soil on the whole is not of remarkable fertility, the finest part of the department being the valley of the Saône. The vine is extensively cultivated. The most important mineral is coal, of which there is an extensive field; iron is also worked. There are manufactures of leather, glass, linen and cotton goods; and the trade is chiefly in agricultural produce, coal, iron, wine, and leather. Mâcon is the capital. Pop. 625,885.

São-Paulo (sâ-u̯n-pâ'u̯-lō), a maritime state of Brazil, between the two states of Minas-Geraes and Paraná; area, 112,940 sq. miles. The coast-line is bold and rocky; behind are mountain chains which divide this state into two basins. That on the east side sends its waters directly to the Atlantic; while the far larger interior basin drains into the Paraná, which bounds São-Paulo on the west. The mountains are generally covered with forests, while on the lower slopes the crops grown are sugar-cane, coffee, cotton, maize, mandioc, tobacco, &c. The province has several harbours on the coast, particularly that of Santos. Pop. 1,386,242, including 300,000 Italian colonists and 20,000 Germans. — São-Paulo, the capital, is the centre of the provincial railways, 86 miles from its seaport Santos, and 143 miles from Rio-de-Janeiro. The principal edifices are the cathedral, several monasteries and convents, the governor's and the bishop's palace, the town-house, &c. Pop. 50,000.

Saouari (sâ-u̯-ä'rē). See *Souari*.

Sap, in military affairs, a narrow ditch or trench by which approach is made to a fortress or besieged place when within range of fire. It runs in a zig-zag, serpentine, or similar direction, so as not to be enfiladed by the fire of the fortress. The trench is formed by trained men (sappers), who place gabions as a cover, filled with the earth taken



Sap, as variously constructed.

from the trench along the intended line of parapet; the earth excavated, after the gabions have been filled, being thrown up to form a parapet capable of resisting artillery. The single sap has only a single parapet; the double has one on each side. Sometimes the sap is entirely covered in. The digging of a sap is generally a dangerous operation.

In the accompanying figure *a* is a double sap on the serpentine plan; *b*, section of single sap, showing portion of gabions; *c*, section of covered sap; *d*, sap on rectangular plan.

Sap, the juice or fluid which circulates in all plants, being as indispensable to vegetable life as the blood to animal life. It is the first product of the digestion of plant food, and contains the elements of vegetable growth in a dissolved condition. The absorption of nutriment from the soil is effected by the minute root-hairs and papillæ, the absorbed nutriment being mainly composed of carbonic acid and nitrogenous compounds dissolved in water. This ascending, or as it is termed *crude sap*, is apparently transmitted through the long cells in the vascular tissue of the stem and branches to the leaves, passing from cell to cell by the process known as endosmose.

Sapajou (sap'a-jö), the name generally given to a group of South American prehensile-tailed monkeys, including fifteen or sixteen species, whose characteristics it is exceedingly difficult properly to define. Among the species may be named the *Cebus fatuellus*, or horned sapajou (also called horned capucin); the *C. monachus* and *C.*

Capucin Sapajou (*Cebus capucinus*).

capucinus, often called the capucin. One of the most common species is the weeper (*Cebus apella*). They are small in size, playful in disposition, leading a gregarious life, and feeding chiefly on fruits and insects.

Sapan-wood, SAPPAN-WOOD, the wood of the *Cæsalpinia Sapan*, a middle-sized leguminous tree, indigenous to Siam, Burmah, India, &c., used as a dye-wood. The dye it yields is of a red colour, but rather inferior.

Sap-green, a pigment prepared by evaporating the juice of the berries of the *Rhamnus catharticus*, or buckthorn, to dryness, mixed with a little alum. It is soluble in water; acids redden it, but the alkalies and alkaline earths restore the green colour. It is used by water-colour painters as a green pigment. Called also *bladder-green*, being kept in bladders to dry and harden.

Saphir, MORITZ, a German humorist, born at Pesth, of Jewish parentage, 1795; died 1858. At an early age he went to Berlin, and successively edited the Berliner Schnellpost, Der Deutsche Horizont, Der Korsar, and Der Humorist.

Sapinda'ceæ, a natural order of polypetalous dicotyledons. It consists of trees or shrubs with erect or climbing stems, inhabitants of most parts of the tropics, more especially of South America and India. The leaves are usually alternate, simple or compound, and the flowers often irregular. The fruit of the *Sapindus saponaria* is used for washing linen.

Sapodilla, a tree of the genus *Achras*, the *A. Sapota*, natural order Sapotaceæ, and found in the West Indies. The fruit resembles a bergamot pear in shape and size. It is often called *naseberry*, and is much prized as an article of diet. The bark of the sapodilla is used in medicine as an astringent, and the seeds as a diuretic.

Sap'onine ($C_{32}H_{34}O_{18}$), a non-nitrogenous vegetable principle found in the root of *Saponaria officinālis* and many other plants. It is soluble in water, and its solution, even when much diluted, froths on being agitated like a solution of soap.

Sap'onite, a hydrous silicate of magnesia and alumina. It occurs in soft, soapy, amorphous masses, filling veins in serpentine and cavities in trap-rock.

Sapota'ceæ, a natural order of plants belonging to the polycarpous group of monopetalous exogens. It consists of trees and shrubs which frequently abound in a milky juice, which may be used for alimentary purposes. They have alternate undivided leaves, small solitary or clustered axillary flowers, and a baccate or drupaceous fruit. They are chiefly natives of India, Africa, and America. Some produce eatable fruits, as the sapodilla plum, marmalade apple, star apple, &c. One of the most important species is the *Isonandra Gutta*, which produces the gutta percha of commerce.

Sappan-wood. See *Sapan-wood.*

Sapper, a soldier whose duties consist in constructing saps or other field-works, &c. Formerly the non-commissioned officers and privates of the Royal Engineers received the general appellation of the Sappers and Miners.

Sapphire (saf'ir), a precious stone, next in hardness and value to the diamond, belonging to the corundum class. Sapphires are found in various places, as Burmah, India, and Ceylon, in Asia; and Bohemia and Silesia, in Europe. The sapphire proper is a beautiful transparent stone of various shades of blue colour. See *Corundum.*

Sappho (saf'ō), a distinguished Greek poetess, born at Mitylene, on the Island of Lesbos, and flourished about 600 B.C. Little is known regarding her life, though she is made the subject of various legends. Of these may be mentioned the common story of her love for Phaon, which, being unrequited, caused her to leap down from the Leucadian Rock. At Mitylene Sappho appears to have been the centre of a female coterie, most of the members of which were her pupils in poetry, fashion, and gallantry. Her odes, elegies, epigrams, of which only fragments have come down to us, display deep feeling and imagination. Her reputation among the ancients almost borders on extravagance.

Saprolegnia, a genus of fungi which grow on dead and living animals and plants in water, and form the characteristic feature of the salmon disease.

Sap-roller, a large gabion filled with another gabion of less diameter as well as with fascines. It is used by sappers, who roll it before them in digging a sap to protect them from the fire of the enemy. See *Sap, Gabion.*

Sap-sucker, the popular American name of several small woodpeckers.

Saraband, a dance used in Spain, or the music adapted to the dance. This is grave and expressive in character, written in $\frac{3}{4}$ or $\frac{3}{8}$ time, and consists of two parts. Handel and other masters frequently wrote tunes of this kind.

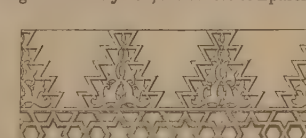
Saracen, an Arabian or other Mussulman of the early and proselytizing period; a propagator of Mohammedanism in countries lying to the west of Arabia. By mediæval writers the term was variously employed to designate the Arabs generally, the Mohammedans of Syria and Palestine, or the Arab-Berber races of Northern Africa. At a later time it was also applied to any infidel nation against which crusades were preached, such as the Turks.

Saracenic Architecture, the style adopted by the followers of Mahomet in building their mosques, palaces, and tombs. Originally the Arabs possessed no distinctive

Mosque of Kaid Bey, Cairo.

architectural style, and the style which they at length made their own was developed by architects belonging to the countries which they had conquered. This style is chiefly represented in Egypt, Persia, Spain, Turkey, and India, but the Saracenic architecture of Spain is generally called by the distinctive name of Moorish. (See *Moorish Architecture.*) The most prominent features of the style are the dome, the minaret, and the pointed arch. The Saracenic domes rise from a square base, are graceful in form, sometimes in groups of three or more, and frequently enriched externally with coloured tiles or other decorations. The minarets

are slender towers of considerable height, rising in stages or stories, each with a balcony, and are most frequently octagonal, sometimes cylindrical, rising, however, from a square base. The arch is of the pointed variety, this form of arch having been used by the Arabs in Egypt before the rise of the Gothic in Europe. It is sometimes of the horse-shoe form. (See *Arch.*) The use of clustered pendentives (*honeycomb work*) to form a transition from the quadrangular area under a dome to the arch of the dome itself is very peculiar and common. Externally the tops of walls are often finished off with an upright cresting, which may be regarded as an ornament taking the place of a cornice. Flat surfaces are freely ornamented with a profusion of scroll-work and conventional foliage, often in intricate and beautiful designs. Stucco is much used in ornamentation. The mosque el-Aksah at Jerusalem, reconstructed by Abd el Malek in A.D. 691, shows evidence of the Christian art of the time in its basilica of seven aisles. In Egypt the Saracenic art began with the mosque which Amru erected at Old Cairo in the 21st year of the Hejira (A.D. 642). Subsequently repaired and altered, it may now be considered as a good specimen of Moslem architectural art when freed from Christian influence. But the perfected Saracenic art dates from the building of a mosque at Cairo by Ibn Tooloon in 876 A.D. This building is nearly square (390 ft. by 455) with a central court, around which on three sides are two ranges of arcades, while on the side towards Mecca there are five. It is built of brick covered with stucco. The mosque and tomb of Kaid Bey, erected in 1463 outside Cairo, is one of the most graceful specimens of Saracenic architecture. When the Turks captured Constantinople in 1453 they appropriated the Christian churches of the city, the most important of which was St. Sophia. Such was their appreciation of this Byzantine building, that they adopted its architectural style with modifications in all the mosques which they subsequently built there. The finest among these was built by Suleiman in 1550 A.D., and occupies nearly a square, being 225 ft. by 205. In Persia the Saracenic architecture is supposed to be a development of the old Babylonian or Assyrian. The ruined mosque of Tabreez, one of the finest of its kind, belongs to the Mogul dynasty, and was begun by Ghazan Khan in 1294 A.D. In form it resembles a Byzantine church, but it is chiefly remarkable for the decorative results obtained by mosaic of glazed bricks and tiles in brilliant colours. The most splendid of Saracenic buildings in Persia was built during the dynasty of the Sufis by Shah Abbas (1585–1629) in his capital of Ispahan. This was the *Maidan* or bazaar, a large rectangular area inclosed by an arcade two storeys in height, and to which was attached the great mosque or Mesjid Shah and other buildings. This latter building is 223 ft. by 130, the centre compartment



Wall-cresting, Mosque of El-Azhar, Cairo.

being surmounted by a double dome, whose external height is 165 feet. Taken in the mass the Maidan Shah, with its gates and mosques, superbly decorated, is one of the most effective specimens of Saracenic architecture. See also *Indian Architecture.*

Saragossa, or ZARAGOZA, a city of Spain, in Aragon, capital of the province of the same name, as well as of the ancient kingdom of Aragon, about 200 miles N.E. of Madrid by rail in a fertile plain irrigated by the Ebro. Seen from outside, the place with its towers, cupolas, and spires, has an imposing character, but inside the streets are mostly tortuous lanes, ill-paved, and worse lighted. The houses are built in solid masonry, and in a highly ornamental style. The principal edifices are the two cathedrals, La Seo and El Pilar. The former is the metropolitan archiepiscopal church, and is mainly Gothic in style, dating from the 12th century; the latter is a huge unattractive building begun in 1677. Other buildings are the vast archiepiscopal palace, the Torre Nueva, an octangular clock-tower for the city, which leans about 9 feet out of the perpendicular; the old irregular citadel called the Aljaferia, built by the Moors, town-house, hospitals, exchange, museum, &c. There is a university of three faculties and about 800 students. The chief manufactures are silk, woollen cloth, leather, soap, hats, &c. Pop. 92,407.

Sarajevo (sär-ä-yā′vō). See *Bosna Serai.*

Saran, a district in the N.W. of the Patna division, Bengal, inclosed by the rivers

Ganges, Gandak, and Gogra; area, 2622 sq. miles. Rice, wheat, and barley are the chief products. Pop. 2,280,382.

Saraswati', in Hindu mythology, the name of the female energy or wife of Brahma, the first of the Hindu triad. She is the goddess of speech, music, arts, and letters.

Sarato'ga Springs, a town of the United States, New York, about 35 miles north of Albany, and 186 miles north of New York city by rail. It owes its prosperity to its mineral-springs, which have made it the most fashionable watering-place in the United States. The springs are characterized by their saline and chalybeate ingredients, combined with carbonic acid gas. It has numerous large and handsome hotels, several churches, &c., and during the season has an influx of about 35,000 visitors. Ordinary population about 12,000.

Sara'tov, a city of Russia, capital of the government of same name, is built on broken and undulating ground on the right bank of the Volga, 459 miles south-east of Moscow, and surrounded by gardens. Its streets are wide, regular, and well paved, and it has a number of fine buildings, including new cathedral, public offices, theatre, railway-station, &c. It has manufactures of cordage, pottery, tobacco, woollen cloth, cotton and silk stuffs, &c. Pop. 122,829.—The government has an area of 32,613 square miles. The eastern boundary is formed by the Volga, but the greater part of the government is drained chiefly by affluents of the Don. The surface is generally diversified by numerous hills and valleys, where a mild climate and good soil combine in raising heavy crops. The principal exports are corn, hemp, flax, tobacco, hops, and madder. Pop. 2,222,000.

Sara'wak, a rajahship in the island of Borneo, under British protection. It is situated on the west and north-west side of the island, and has a coast-line of about 400 miles, while it extends inland for more than 100 miles; area about 50,000 square miles. The soil, consisting generally of black vegetable mould, is peculiarly adapted to the sugar-cane, which grows readily even without cultivation; but the more important vegetable productions are cocoa-nuts, rice, and sago. The minerals include gold, antimony, and quicksilver, and diamonds are also found. The original inhabitants are Dyaks, but are now very much intermixed with Malays and Chinese. The rajahship was conferred upon Sir James Brooke by the Sultan of Borneo in 1841 in return for distinguished services in quelling disturbances and restoring order, and when he died in 1868 he was succeeded by his nephew (see *Sir James Brooke*). Capital, Kuching (which see). Pop. 300,000.

Sarci'na, a genus of minute plants of low organization and doubtful nature, but generally believed to be fungi, commonly found in matter discharged by vomiting from stomachs affected with cancer and certain forms of dyspepsia.

Sar'cocarp, in botany, the fleshy part of certain fruits, placed between the epicarp and the endocarp. It is that part of fleshy fruits which is usually eaten, as in the peach, plum, &c.

Sar'cocol, SARCOCOLLA, a semi-transparent gum-resin, imported from Arabia and Persia in grains of a light yellow or red colour, and formerly used medicinally.

Sar'code, the name given to the unorganized or structureless gelatinous matter forming the substance of the bodies of animals belonging to the division Protozoa. It is nearly equivalent to protoplasm, so that it is sometimes called 'animal protoplasm' or 'bioplasm.'

Sarcoph'agus, a coffin or tomb of stone; a kind of stone chest, generally more or

Egyptian Sarcophagus—Third Pyramid.

less ornamented, for receiving a dead body. The oldest known sarcophagi are Egyptian, and have been found in certain of the pyra-

Roman Sarcophagus—Tomb of Scipios.

mids. Two of the most celebrated of these are the great sarcophagus taken by the British in Egypt in 1801, now in the British Museum, and the alabaster sarcophagus in

the Soane Museum, London. Sarcophagi were also used by the Phœnicians, Persians, and Romans; and in modern times stone coffins have not been uncommon for royalty and persons of high rank.

Sarcorhamphus, a genus of vultures, including the condor and the king vulture.

Sard, a variety of chalcedony, which displays on its surface a rich reddish brown, but when held between the eye and the light appears of a deep blood-red carnelian. Called also *Sardoin*.

Sardanapa'lus, the name in Greek of several kings of Assyria, one of whom is said to have been the last king of Assyria. He is represented by Ctesias as a very effeminate prince, wholly given to sensual indulgence and inactivity, and it is related that Arbaces, a Median satrap, in conjunction with Belesis, a Babylonian priest, raised an army of Medes against him about 785 B.C. This army, attacking his camp by night, gained a great victory, and pursued the fugitives to the gates of Nineveh. Here Sardanapalus defended himself for two years, but ultimately set his palace on fire and perished in the conflagration with all his wives and attendants. See *Assyria*.

Sardha'na, a town in the Meerut district of the North-west Provinces of India, about 12 miles N.W. of Meerut. Pop. 13,313.

Sar'dica, anciently a town in Lower Dacia, on the site of the modern Turkish town of Sofia or Sophia. The town is chiefly celebrated as the place where an ecclesiastical council was held in 347, at which Athanasius defended himself against the Arians.

Sardine (*Clupea sardina*), a small fish, now generally regarded as identical with the pilchard, abundant in the Mediterranean and also on the Atlantic coasts of France, Spain, and Portugal. It is much esteemed for its flavour, and large quantities are preserved by being salted and partly dried, then scalded in hot olive-oil, and finally hermetically sealed in tin boxes with hot salted oil, or oil and butter.

Sardin'ia (Italian, *Sardegna*), an island in the western half of the Mediterranean, forming part of the Italian Kingdom and separated from the island of Corsica by the Strait of Bonifacio, not quite 7 miles wide; length, 152 miles; central breadth, about 66 miles; area, 9350 sq. miles. The coast is in great part rugged and precipitous, and though the island is nearly in the form of a parallelogram there are some important indentations, such as the Gulf of Asinara in the north-west, the Bay of Oristano in the west, and the Gulf of Cagliari in the south-east, on which Cagliari, the capital of the island, is situated. The interior is generally mountainous; the chain which traverses Sardinia sends out branches east and west, and culminates in Brunca, 6291 feet, and Gennargentu, 6132 feet. Between the mountain ridges are extensive plains or valleys. The streams are numerous, but unnavigable, the largest being the Tirso, which pours its waters into the Gulf of Oristano on the west coast. In the vicinity of the coast are a series of lagoons. As regards the geological structure of the island crystalline rocks occupy a considerable area, in which granite, overlaid by gneiss and mica-schist, predominates, but sedimentary rocks are also well represented, as also volcanic formations, a number of ancient craters being traceable. The mineral riches of the island consist chiefly of lead, zinc, copper, quicksilver, antimony, and iron of excellent quality. Iglesias, near the west coast, is the centre of the mining district. The other minerals are porphyry, alabaster, marble, lignite, &c. The climate is similar to that which obtains generally over the Mediterranean region. The range of the thermometer is between 34° and 90°, and the mean annual temperature 61° 7′. During the hot season an unhealthy malaria infects the low-lying tracts. The winter months are rainy, and the pleasantest season is in the autumn. Much of the land is of remarkable fertility. The principal crop is wheat; barley, maize, beans, &c., are extensively grown; the vine is well adapted both to climate and the soil; and olive-grounds are met with in various quarters. The rearing of live stock forms an important industry. Game of all kinds is very abundant. Wild boars, stags, deer, and mufflons frequent the woods and forests. The most valuable fishery is that of the tunny. Manufactures are chiefly confined to a few coarse tissues woven by the women at their homes for private use. The trade consists of the exports of corn, wine, brandy, timber, fish, cattle, lead ore, calamine, salt, &c.; the imports include cotton, colonial produce, hosiery, hardware and metals, coal, &c. Railways now traverse the island. For administrative purposes Sardinia is divided into the two provinces of Cagliari and Sassari. The inhabitants are of Italian race, with a mixture of Spanish, and are characterized by a chivalric sense of honour and

hospitality, but the family feud or *vendetta* still exists. Education is in a very backward state, and altogether civilization is rather primitive. The early history of the island is involved in much obscurity. It passed from Carthage to Rome in 238 B.C., and latterly came successively into the hands of the Vandals, the Goths, the Longobards, and Saracens. In 1297 Boniface VIII. invested the kings of Aragon with Sardinia, and it continued in the possession of Spain till 1708, when it was taken possession of by the British. By the Peace of Utrecht it fell to Austria, and in 1720 to the House of Savoy, being from that time onward part of the kingdom of Sardinia. See next article. Pop. 730,240.

Sardinia, KINGDOM OF, a former kingdom of the south of Europe, composed of the Island of Sardinia, the Duchy of Savoy, the Principality of Piedmont, the County of Nice, the Duchy of Genoa, and parts of the Duchies of Montferrat and Milan; 28,229 square miles; pop. (1858), 5,194,807. In 1720 Victor Amadeus II., duke of Savoy, on receiving the island of Sardinia in exchange for Sicily, took the title of King of Sardinia. He was succeeded by Charles Emmanuel III., Victor Amadeus III., and Charles Emmanuel IV., who in 1802 abdicated in favour of his brother Victor Emmanuel I., the royal family having by this time, during the domination of Napoleon, taken refuge on the island of Sardinia. In 1814 the king returned to Turin, where the seat of government was established. An insurrection occasioned his abdication in 1821 in favour of Charles Felix, who, after a reign of ten years, was succeeded by Charles Albert. In 1848 he headed the league which endeavoured to drive the Austrians from Italy. The defeat of the Sardinian forces at Novara (1849) by Radetsky, however, caused him to abdicate in favour of his son Victor Emmanuel II. The position of Sardinia was strengthened by the part which it played (1854) in the Crimean war, while in 1859 the co-operation of France was secured in a war against Austria. The brief campaign which followed ended in the defeat of the Austrians at Magenta and Solferino, and led to Sardinia receiving a large increase of territory, though she had to cede Savoy and Nice to France. Soon after this the Sardinian Kingdom was merged in a united Italian Kingdom under Victor Emmanuel. See *Italy*.

Sardis, or SARDES, the ancient capital of Lydia, on the river Pactolus, not far from the mount Tmolus. Under the Persians it was a magnificent city on the commercial route from Asia to Europe. Sardis was the seat of one of the seven churches of the Apocalypse. A small village with some ruins stands at present on its site.

Sard'onyx, a precious stone, a beautiful and rare variety of onyx, consisting of alternate layers of sard and white chalcedony. The name has sometimes been applied to a reddish-yellow or nearly orange variety of chalcedonic quartz resembling carnelian, and also to carnelians whose colours are in alternate bands of red and white.

Sardou, VICTORIEN, French dramatist, born at Paris in 1831. The son of a professor, he at first studied medicine, but abandoned this in favour of literature. His earliest venture was the comedy of La Taverne des Étudiants, which proved a failure at the Odéon. He was successful, however, with two plays which he wrote for Déjazet called M. Garat (1860) and Les Prés-Saint-Gervais (1862). His better-known works, many of which have been produced on the English stage, are Les Pattes de Mouche, Nos Intimes, La Patrie, Daniel Rochat, Thermidor, and Madame Sans-gêne. Some of his successes have been associated with Madame Bernhardt, for whom he wrote Féodora, Théodora, and La Tosca.

Saree', a cotton fabric worn by Indian women to wrap round the person; also, an embroidered long scarf of gauze or silk.

Sargassum. See *Gulf-weed*.

Sargent, EPES, an American poet and dramatist, was born at Gloucester, Mass., in 1813; died at Boston in 1880. He was educated in the latter city and at Harvard University; became associated with the Boston Advertiser and the Atlas; removed to New York, where he was assistant on the Mirror; and subsequently returned to Boston to become editor of the Evening Transcript. He afterwards devoted himself entirely to literature, and produced, among other plays, The Bride of Genoa, a poetical drama; Velasco, a tragedy; various novels and books of adventure; a Life of Henry Clay (1852); and two volumes of poetry. He was the author of that well-known lyric, A Life on the Ocean Wave.

Sargon, an Assyrian king. See *Assyria*.

Sari, a town, Persia, capital of the province of Mazanderan, 22 miles east of Balfrush, and 15 miles from the shore of the Caspian. A considerable trade is carried

on with the interior of Persia and the Russian government of Astrakhan. Pop. 15,000.

Sark, or SERCQ, one of the Channel Islands, situated about 8 miles from Guernsey. It is divided into Great Sark and Little Sark, the connection between these being a narrow neck of land called the Coupée; length about 5, and breadth about 3 miles. The island is surrounded by almost inaccessible rocks, and the carriage-ways are steep. Fishing, which is the chief employment, is now facilitated by a new pier, and the manufactures are principally stockings, gloves, &c. Pop. 578.

Sarlac, SARLIK, a name of the yak. See *Yak*.

Sarmatians, a people of supposed Asiatic race, who, in the time of the Romans, occupied the vast region between the Black, Baltic, and Caspian Seas. They were a nomadic race, whose women went to war like the men, and they were said by tradition to be descended from the Amazons by Scythian fathers. Sarmatia coincided in part with Scythia, but whether the people were of the same race is doubtful.

Sarnen, a town in Switzerland, capital of the canton of Unterwalden, near a lake of the same name, where the Aa issues from it, 11 miles S.S.W. of Lucerne. Pop. 4039.

Sar'nia, a town of Canada, province of Ontario, on the river St. Clair, near where it leaves Lake Huron, opposite Port Huron, to which is a sub-river railway. It has various manufactures, and a large trade by railroad and steamer. Pop. 6693.

Sarno, a town, Southern Italy, in the province of Salerno, at the foot of the Apennines, near the source of a river of the same name, 12 miles N.N.W. of Salerno. It is well built, has a cathedral (1625), mineral springs, copper and other foundries, paper-mills, &c. Pop. 14,464.

Sarong', a garment used in the Indian Archipelago. It consists of a piece of cloth wrapped round the lower part of the body. The sarong is worn by men and women.

Saronic Gulf (*Sinus Saronicus*), the ancient name of the Gulf of Ægina.

Sarotham'nus, a genus of leguminous plants. *S. scoparius* is the well-known broom, the *Cytisus scoparius* of De Candolle.

Sarpe'don, in Greek mythology, a son of Zeus and Laodamia, king of the Lycians and ally of the Trojans. He was slain by Patroclus.

Sarpe'don (*Papilio Sarpēdon*), a beautiful species of butterflies found in Asia, Australia, and the Sandwich Islands.

Sarpi, PIETRO, known also as FRA PAOLO, born at Venice 1552, died 1623. He entered the order of the Servites, and became their procurator-general in 1585. Sent to the Venetian Republic as representative from Pope Paul V. in the controversy of church and state, Sarpi upheld the claims of the republic, and in consequence was excommunicated. In the seclusion of his cell he wrote and published under the pseudonym of Pietro Soave Polano an elaborate attack on papal policy called Istoria del Concilio Tridentino (History of the Council of Trent).

Sarplar, a large sack or bale of wool containing 80 tods; a tod contains 2 stone of 14 pounds each.

Sarracenia'ceæ, a natural order of polypetalous exogens which consists of herbaceous perennial plants, remarkable for their pitcher-like leaves. There are three genera (*Sarracenia*, *Darlingtonia*, and *Heliamphora*) the species of which are inhabitants of northern or tropical America. The pitcher-like leaves of *Sarracenia* are capable of holding water, and the older leaves are usually full.

Sarsaparil'la, the rhizome of several plants of the genus *Smilax*. *S. medica* supplies the sarza of Vera Cruz. *S. siphilitica*, or *S. papyracea*, yields the Lisbon or Brazilian sort. *S. officinālis* belongs to Central America, although it yields the kind known as Jamaica sarsaparilla. *Hemidesmus indicus* (an asclepiadaceous climber) yields the East Indian sort. Sarsaparilla is valued in medicine on account of its mucilaginous and demulcent qualities.

Sarsen, SARSEN-STONE, a name given to the large flat blocks of sandstone found lying on the chalk-flats or downs of Wiltshire, &c. Also named *gray wether* and *druids' stone*.

Sar'sia (from the Norwegian naturalist *Sars*, 1805–69), a genus of cœlenterate animals, belonging to the Medusidæ or jelly-fishes, and perhaps more properly regarded as the floating reproductive buds or gonophores of fixed zoophytes.

Sarthe (sârt), a department of North-west France; area, 2395 sq. miles. It has a diversified surface, presenting fertile plains, vineyards, and extensive forests. Wheat, oats, barley, beet-root, and hemp are grown, while cider and wine are largely produced. The only mineral of any consequence is iron, but there are excellent sandstone, limestone, millstone, slate, and marble quarries. The capital is Le Mans. Pop. 436,111.

Sarti, GIUSEPPE, an Italian composer, born 1729, died 1802. At the age of twenty-two his first opera, Pompeo in Armenia, was put upon the stage at Faenza, his native place. Other operas soon followed, and he became successively court chapel-master at Copenhagen; director of the Conservatory dell' Ospedaletto at Venice, and chapel-master of the Milan cathedral. In 1784 he was invited by the Empress Catherine to St. Petersburg, where he founded a musical conservatory. He wrote, in all, about thirty operas, and was for some time teacher to Cherubini.

Sarto, ANDREA DEL, a painter of the Florentine school, one of the most distinguished painters of the 16th century, born at Florence in 1486, died of the plague 1531. His proper name was Andrea d'Agnolo, the name del Sarto (of the Tailor) being applied to him from the occupation of his father. He painted many frescoes in his native city, and Francis I. induced him to go to France in 1518. He soon returned to Italy, and having appropriated large sums which had been given him by his royal patron to purchase the pictures of great masters in Italy, he could not go back to France. Among his most important easel-pictures are the Sacrifice of Abraham and the Marriage of St. Catherine, in the gallery of Dresden; the Madonna di San Francesco, an Annunciation, and an Assumption of the Virgin, at Florence; Virgin and Child with St. Joseph, at Madrid. He is best known in galleries by his Holy Families. He was highly distinguished for his excellence in fresco, and it was in this form of art that his naturalness of design, fineness of colour, and careful execution became most apparent.

Sartorius Muscle, or 'tailor's muscle,' in anatomy, a muscle of the thigh, so called from the fact that by its contraction the legs are crossed in sitting in the manner in which tailors usually do.

Sarum, OLD, an ancient and now deserted borough in Wiltshire, 2 miles north of Salisbury. It was once a considerable city, and two members, up to the passing of the reform bill of 1832, were returned to parliament by the proprietors. It was the original situation of Salisbury (New Sarum), and the bishop had a castle here, but the see was removed to Salisbury in the year 1219.

Sarza'na, a town of N. Italy, province of Genoa, 8 miles east of Spezia, near the Magra. It has a cathedral in the Italian Gothic style (1355–1470). Pop. 5455.

Sarzeau (sàr-zō), a sea-bathing town of France, department of Morbihan, on the south side of the Bay of Morbihan, 14 miles from Vannes. Pop. 5704.

Sa'sin, the common Indian antelope (*Antilope cervicapra*), remarkable for its swiftness and beauty. It is abundant in the open dry plains of India, in flocks of from

Sasin or Indian Antelope (*Antilope cervicapra*).

ten to sixty females to a single male. It is grayish brown or black on the upper parts of the body, with white abdomen and breast, and a white circle round the eyes, and stands about 2 feet 6 inches high at the shoulder.

Sasine (sā'zin), in Scots law, a term used to signify either the act of giving legal possession of feudal property (in which case it is synonymous with *infeftment*), or the instrument by which the fact is proved. There is a general office for the registering of sasines in Edinburgh.

Saskatch'ewan, a great river of Canada, which rises in the Rocky Mountains near lon. 115° w. by two principal heads, the sources of which are not far apart. These branches, often called the North and the South Saskatchewan, flow generally east to their junction about 150 miles north-west of the north-west angle of Manitoba, whence the river takes a curve north-east and south-east, and, passing through Cedar Lake, empties itself into Lake Winnipeg, after a course of about 1300 miles, measuring along the south branch, some 70 less measuring along the north. It is fed by numerous tributaries, and flows through a region yielding coal, salt, iron, &c., having a fertile soil, and now attracting numbers of settlers. (See *Canada*.) The main stream and its branches afford about 1000 miles of navigable waterway.

Saskatchewan, a district and future province of Canada, named from the above

river, bounded on the S. by Assiniboia, E. by Lake Winnipeg and Nelson River, N. by the 55th parallel, and W. by Alberta. Area, 107,092 square miles; pop. 15,000. Capital, Battleford. Prince Albert is the other chief town, both being on the Saskatchewan.

Sas'saby (*Damâlis lunâtus*), an antelope found in South Africa, living gregariously in herds numbering from six to ten individuals. The body-colour is a reddish-brown, the limbs being of dark hue, whilst a blackish stripe marks the forehead and middle of the face.

Sas'safras, a genus of plants, nat. order Lauraceæ. The species most known is the *S. officinale* (the sassafras laurel), on account of the medicinal virtues of its root. It is a small tree or bush inhabiting the woods of North America from Canada to Florida. The taste of sassafras is sharp, acrid, aromatic; it is used for flavouring purposes, and in medicine as a stimulant. *Swamp-sassafras* is the *Magnolia glauca*, an American tree.

Sassan'idæ, a Persian dynasty of kings, which succeeded the Parthian dynasty of the Arsacidæ, and reigned from 226 B.C. to about A.D. 636. The dynasty began with Ardishír Babigán, and owes its name to the grandfather of that prince, named Sassan.

Sas'sari, a town of Italy, in Sardinia, capital of the province of same name, 105 miles N.N.W. of Cagliari. It has a large cathedral, several palaces, picturesque castle, a university, hospital, &c. The only manufacture of importance is tobacco, and the trade is chiefly in grain, oil, cheese, and goat-skins. Pop. of town, 31,596; of province occupying the north and more fertile part of the island, 261,367.

Sasseram', a town of India, in Bengal, about 70 miles S.E. from Benares. The town, otherwise of small importance, contains the tomb of the Afghan Shere Shah, who became Emperor of Delhi. Pop. 22,000.

Sassoferra'to, a painter, so called from the place of his birth, a town in the province of Ancona, in Italy. His true name was *Giambattista Salvi*. He was born in 1605, and died 1685. His paintings were chiefly the Madonna and Child, the latter sleeping.

Sas'solin, native boracic acid, occurring as a deposit from hot springs and ponds in the lagunes of Tuscany, and first discovered near *Sasso*, in the province of Florence.

Satali'eh. See *Adalia*.

Satan. See *Devil*.

Sata'ra, a district, in the Bombay Presidency, India; area, 4987 sq. miles, forming part of the table-land of the Deccan, much broken by ridges, ravines, and isolated heights. The chief river is the Kistna, which flows south-east through its centre. Pop. 1,225,989.—The capital of the district is also called Satára, and is situated 55 miles south of Poona, near the confluence of the Krishna and the Yena. Pop. 29,601.

Sat'ellite, a secondary planet, or moon; a small planet revolving round a larger one. The earth has one satellite, called the moon; Neptune is also accompanied by one; Mars by two; Uranus by six; Jupiter by four; Saturn by eight. Saturn's rings are supposed to be composed of a great multitude of minute satellites.

Satin, a soft, closely-woven silk, with a glossy surface. In the manufacture of satin part of the weft is left beneath the warp, which, presenting a close and smooth surface, acquires, after being passed over heated cylinders, that lustre which distinguishes it from other kinds of silks.

Satin-bird, an Australian bird, the *Ptilonorhynchus holosericeus*, so called from the glossy dark-purple plumage of the male. It is one of the bower-birds (which see).

Satinet, a twilled cloth made of woollen weft and cotton warp pressed and dressed to produce a glossy surface in imitation of satin.

Satin-spar, a variety of calc-spar or carbonate of lime, distinguished by a silky lustre and fibrous structure. The name is also sometimes applied to fibrous gypsum or sulphate of lime.

Satin-wood, the wood of a large tree of the genus *Chloroxylon*, the *C. swietenia*, nat. order Cedrelaceæ. It is a native of the mountainous parts of the Circars in the East Indies. The wood is of a deep yellow colour, close-grained, heavy and durable.

Satire, in the widest sense of the word, pungent ridicule or cutting censure of faults, vices, or weaknesses. In a narrower sense it is a poem, of which ridicule and censure are the object and chief characteristic. This species of poetry had its origin with the Romans, but satires may also take the forms of epistles, tales, dialogues, dramas (as with Aristophanes), songs, epics, fables, &c. The didactic satire originated with Lucilius (148–103 B.C.), and Horace, Juvenal, and Persius developed it. Satirists are common in all modern literatures.

Satlej. See *Sutlej*.

Satraps, in the ancient Persian Empire, the governors of the provinces which were called *satrapies*. The power of the satrap, so long as he retained the favour of his sovereign, was absolute; he levied taxes at his pleasure and aped the capricious tyranny of his master unchecked.

Saturation. In meteorology the air is said to be saturated with aqueous vapour, if, when the temperature is slightly lowered, condensation takes place. The degree of saturation at any place is called the hygrometric state. (See *Hygrometer*.) The term is applied in chemistry to the union, combination, or impregnation of one body with another in such definite proportions as that they neutralize each other, or till the receiving body can contain no more.

Saturday (A. Sax. *Sæterdæg, Sæterndæg* —*Sæter, Sætern*, for Saturn, and *dæg*, a day —the day presided over by the planet Saturn), the seventh or last day of the week; the day of the Jewish Sabbath.

Saturday Review, a London weekly, political, literary, and social paper, founded in Nov. 1855. It has long been noted for its smart, slashing, fearless style of criticism, and has numbered many eminent names among its contributors. In politics it is independently Conservative.

Saturn, an ancient Italian deity, popularly believed to have made his first appearance in Italy in the reign of Janus, instructing the people in agriculture, gardening, &c., thus elevating them from barbarism to social order and civilization. He was consequently elected to share the government with Janus, and his reign came afterwards to be sung by the poets as 'the golden age.' He was often identified with the Cronus of the Greeks. His temple was the state treasury. Ops was his wife. He is often represented as an elderly man, with a sickle and ears of corn in his hand. See *Saturnalia*.

Saturn, one of the planets of the solar system, less in magnitude than Jupiter, and more remote from the sun. Its mean diameter is about 70,000 miles, its mean distance from the sun somewhat more than 872,000,000 miles, and its year or periodical revolution round the sun nearly twenty-nine years and a half. Its mass is about 90 times that of the earth. Saturn is attended by eight satellites, and surrounded by a system of flat rings, which are now supposed to be an immense multitude of small satellites, mixed probably with vaporous matter. See *Planet*.

Saturna'lia, a festival held by the Romans in honour of Saturn, and during which the citizens, with their slaves, gave themselves up to unrestrained freedom and mirth. It contained at first one day; then three; afterwards five; and finally, under the Cæsars, seven days, namely, from the 17th to the 23d of December. During its continuance no public business could be transacted, the law courts were closed, the schools kept holiday, and slaves were freed from restraint. Masters and slaves even changed places, so that while the servants sat at table, they were waited on by their masters and their guests. In the last days of the festival presents were sent by one friend to another.

Satyrs, in Greek mythology, a class of woodland divinities, in later times, inseparably connected with the worship of Dionysus (Bacchus). The satyrs appear in works of art as half-man and half-goat, having horns on the head, and a hairy body with the feet and tail of a goat. They are described as being fond of wine and of every kind of sensual gratification. One of the most famous specimens of Greek art is the Satyr (or Faun) of Praxiteles.

Sauerkraut (zou'ér-krout), a favourite German dish, consisting of cabbage cut fine, pressed into a cask, with alternate layers of salt, and suffered to ferment till it becomes sour.

Saugor, or SÁGOR, a district of the Jabalpur division, Central Provinces, India; area, 4005 sq. miles. In some parts the soil is good, and wheat is grown in large quantities. The district is administered by a deputy commissioner. Pop. 591,743.—The principal town has the same name, and is situated near a fine lake surrounded by hills, about 180 miles north of Nagpur. The town is well built, and has a considerable trade and a military cantonment. Pop. 44,416.

Saul, king of Israel from about 1095 to 1056 B.C., and the son of Kish, a Benjamite. Selected for this office by Samuel, he obtained, by his personal courage and military capacity, several successes over the Philistines, Edomites, Moabites, and Ammonites, by means of which he consolidated the tribes and confirmed his authority. After a long reign the wild nature of the king at length showed itself in a kind of religious frenzy. This frenzy, which is briefly described in the Bible as an 'evil spirit of God,' led him to the massacre of the priests of Nob and various similar excesses. Meanwhile the prophet Samuel, estranged by the king's

misdeeds, had anointed David as his successor, and this took effect when Saul was slain by his own sword in a battle with the Philistines on Mount Gilboa.

Saul-tree, SAL-TREE. See *Sál.*

Saumaise. See *Salmasius.*

Saumarez, or SAUSMAREZ (sō′ma-rā), JAMES, BARON DE, an English admiral, born in St. Peter Port, Guernsey, 1757; died 1836. He entered the navy at the age of thirteen; accompanied Sir Peter Parker in the attack on Charleston, and served in America four years; was raised to the rank of commander for his conduct in the engagement against the Dutch off the Dogger Bank (1781); contributed to Rodney's victory over De Grasse; in 1793 was knighted for the capture of a French frigate; in 1795 in command of the *Orion*, seventy-four, opened the battle of L'Orient, where the French fleet was defeated; shared in the victory off Cape St. Vincent (1797); and was second in command to Lord Nelson in the victory of the Nile (1798). On his return to England he was made rear-admiral of the blue. In 1801 he defeated a Franco-Spanish fleet of ten sail of the line and four frigates, his own squadron consisting of only half that number. For this action he received the thanks of both houses of parliament, and a pension of £1200 per annum. In 1831 he was raised to the peerage.

Saumur (sō-mür), a town of North-west France, department of Maine-et-Loire, on the Loire, 25 miles S.S.E. of Angers. It is irregularly built, has an old castle (dating from 1240), now an arsenal and gunpowder factory, three ancient churches, a court-house, town-house, communal college, military and other schools, &c. Sparkling white wines are extensively grown in the neighbourhood. Pop. 12,432.

Saunderson, NICHOLAS, a celebrated blind mathematician, born in Yorkshire, in 1682; died 1739. When a year old he lost his eyesight through the small-pox. Notwithstanding this he acquired an excellent education, especially in mathematics and physics. In 1707 he went to Cambridge, where he lectured on optics, became acquainted with Sir Isaac Newton, and was chosen mathematical professor. His treatise on algebra was published after his death, at Cambridge (1740, two vols.).

Sau′ria, the term by which the great order of lizards is sometimes designated, including not only the existing lizards, crocodiles, monitors, iguanas, chameleons, &c., but also those fossil reptiles the ichthyosaurus, plesiosaurus, iguanodon, pterodactyle, &c.

Sauroid Fishes, fishes, chiefly fossil, that combine in their structure certain characters of reptiles. The existing sauroid fishes consist of several species, the best known being the bony pikes and sturgeons.

Saurop′sida, Professor Huxley's name for the second of his three primary sections of vertebrates, comprising birds and reptiles. The animals of this section are characterized by the absence of gills, by having the skull jointed to the vertebral column by a single occipital condyle, the lower jaw composed of several pieces, and united to the skull by means of a special (quadrate) bone, and by possessing nucleated red blood corpuscles, as well as by certain embryonic characters.

Sauropteryg′ia, an extinct order of reptiles, of which the *Plesiosaurus* may be regarded as the type.

Saura′ræ ('lizard-tails'), an extinct order of birds, including only a single member, the *Archæopteryx*, which has a lizard-like tail longer than the body. See *Archæopteryx.*

Saury-pike, a fish of the genus *Scomberesox*, family Scomberesocidæ, and order Pharyngognathi, having a greatly elongated body covered with minute scales. The jaws are prolonged into a long sharp beak. One species (*S. saurus*), about 15 inches long, occurs plentifully on the British coasts, frequenting firths in shoals so dense that it may be taken in pailfuls. In order to escape the pursuit of the porpoise and large fishes it often leaps out of the water or skims rapidly along the surface, whence it has obtained the name of *skipper.*

Sausage, an article of food, consisting of chopped or minced meat, as pork, beef, or veal, seasoned with sage, pepper, salt, &c., and stuffed into properly cleaned entrails of the ox, sheep, or pig, tied at short intervals with a string. When sausages are made on an extensive scale the meat is minced and stuffed into the intestines by machinery.

Saussure (sō-sür), HORACE BENEDICT DE, Swiss savant, born near Geneva, in 1740; died 1799. At the age of twenty-two he was appointed professor of philosophy in the University of Geneva, and continued to discharge the duties of this office for twenty-five years. A favourite object of his investigations was the structure and height of mountains; and he rendered valuable services to physics, geology, &c. Among his writings are Essais sur l'Hygrométrie and Voyages dans les Alpes.

Sauterne, a white Bordeaux wine of high repute, produced from grapes grown in the neighbourhood of *Sauternes*, a village in the department of Gironde, S.E. of Bordeaux.

Savage, RICHARD, a poet and literary character who has been made famous by Dr. Johnson in his Lives of the Poets. Born in 1697, he claimed to be the illegitimate son of Richard Savage, Earl Rivers, by the Countess of Macclesfield. The mysterious story of his birth and the protracted persecution to which he claimed to have been subjected by his mother, although believed by Dr. Johnson, have not been above suspicion. What is certain is that he was apprenticed to a shoemaker, and displayed his literary capacities in the two comedies of Woman's a Riddle and Love in a Veil. These efforts procured him favourable notice, and he afterwards produced his tragedy of Sir Thomas Overbury, and the poems, the Bastard and the Wanderer. In 1727 he was condemned to death for killing a Mr. Sinclair in a tavern brawl, but his pardon was procured. Thereafter he lived upon the bounty of his friends and a pension from government of £50; but his dissipation and extravagance eventually brought him to a debtors' prison in Bristol, where he died in 1743.

Savage Island, a small coral island in the Pacific Ocean, lat. 19° S., lon. 170° W. It is about 30 miles in circuit, and has a population of 5000 nominal Christians. It was annexed by Britain in 1888.

Savan'na, SAVANNAH, an extensive open plain or meadow in a tropical region, yielding pasturage in the wet season, and often having a growth of undershrubs. The word is chiefly used in tropical America.

Savan'nah, a river of the U. States, which forms the north-east boundary of Georgia, and separates it from South Carolina. It is formed by the junction of the Tugaloo and Keowee, 100 miles by the course of the river above Augusta, and is navigable for vessels drawing over 18 feet to the city of Savannah, 18 miles from the sea.

Savannah, a city of the United States, capital of Chatham county, Georgia, on the south bank of Savannah River, 18 miles from the sea (by river). It is built on a flat sandy bluff 40 feet high, and is beautifully laid out with wide streets and many squares, most of which are adorned by magnolias, live-oaks, and other stately trees. It has a well-wooded park, several good monuments, handsome cotton exchange, courthouse, and other public buildings. It is the second cotton port of the U. States, and exports also quantities of timber, turpentine, rosin, &c., besides fruits and early vegetables coastwise. From evaporation of the surrounding waters the atmosphere during summer is very humid. Pop. 43,189.

Sav'ary, ANNE-JEAN-MARIE-RENÉ, Duke of Rovigo, French general, born 1774; died 1833. In 1789 he entered an infantry regiment, and being appointed adjutant to Bonaparte after the battle of Marengo, he rose high in his confidence, and was entrusted with the execution of the Duke d'Enghien, finally being rewarded with the title of Duke of Rovigo. He was sent to Spain to arrange for Joseph Bonaparte being made king, and in 1810 succeeded Fouché as minister of police. When the emperor returned from Elba he was joined by Savary, who, after the defeat at Waterloo, desired to share his imprisonment in St. Helena. He was afterwards employed by the government of Louis Philippe as commander-in-chief in Algeria.

Save (sāv), incorrectly SAU, a river of Austria, rises in the Julian Alps, flows south-east through Carniola, separates Carniola from Styria, flows through Croatia, and after a course of about 540 miles joins the Danube at Belgrade. It is in great part navigable.

Saverne. See *Zabern.*

Savigliano (sa-vēl-yä'nō), a town, Northern Italy, province of Cuneo, situated in an angle formed by the confluence of the Maira and Grana, 31 miles south of Turin. It is well built, and has ancient walls and towers. Pop. 14,312.

Savigny (sä'vin-yē), FRIEDRICH KARL VON, a German jurist, born at Frankfort-on-the-Main 1779, died 1861. Sent to the University of Marburg he devoted himself to the study of jurisprudence, took his degree, and delivered lectures on his special branch of study. In 1803 he published Das Recht des Besitzes, which was translated into English by Sir Erskine Perry, under the title of Savigny's Treatise on Possession. In 1808 he became professor of law in the University of Landshut, Bavaria, and two years later filled the chair of jurisprudence in the University of Berlin, where he continued for thirty-two years. His principal works are: Geschichte des Römischen Rechts im Mittelalter (six vols. Heidelberg, 1826–31); System des heutigen Römischen Rechts (eight vols. Berlin, 1840–48), to which Das Obligationsrecht (two vols. Berlin, 1851

–53) forms an appendix; Vermischte Schriften (five vols. Berlin, 1850).

Savile, or SAVILLE, GEORGE. See *Halifax.*

Savile, SIR HENRY, English scholar, born 1549; died 1622. After graduating at Brasenose College, Oxford, he removed on a fellowship to Merton College, in the same university. Having made a tour on the Continent for the purpose of perfecting himself in literature, he was on his return appointed tutor in Greek and mathematics to Queen Elizabeth. Subsequently he was appointed warden of his college and provost of Eton. He founded two professorships in geometry and astronomy at Oxford, and published Commentaries on Roman Warfare; Rerum Anglicarum post Bedam Scriptores; Prælectiones in Elementa Euclidis; and the writings of St. Chrysostom.

Sav'in, SAV'INE, a tree or shrub of the genus *Junipĕrus,* the *J. Sabinea.* (See *Juniper.*) The savin of Europe resembles the red cedar (*J. virginiana*) of America, and the latter is therefore sometimes called savin.

Savings-banks. See *Bank.*

Savo'na, a seaport, Northern Italy, province of Genoa, on the west side of the Gulf of Genoa. It is charmingly situated amidst lemon and orange gardens, and has a small but secure harbour defended by a fort. It has a cathedral dating from 1604, and a handsome theatre dedicated to the poet Chiabrera, who was a native. The industries include pottery, silk, wool, glass, paper, &c. Pop. 27,093.

Savonaro'la, GIROLAMO, Italian ecclesiastical reformer, born at Ferrara 1452. Educated for the medical profession, he yet secretly entered the order of Dominicans at Bologna in 1475. In 1482 he was sent to St. Mark's convent at Florence, and began to preach there, but with little success. He retired into Lombardy, and there his increasing fame as a preacher and theologian induced Lorenzo de' Medici to invite him (1490) to return to Florence. And now his discourses attracted such crowds that the church could not contain them, the great theme of his eloquence being the corruptions in church and state, and the general iniquity of the times. In 1491 he was elected prior of St. Mark's. At this time Italy enjoyed profound peace, but Savonarola startled his hearers by foretelling the advent of foreign enemies bringing desolation; and this prediction was considered by the people to have been fulfilled when Charles VIII. of France in 1494 invaded Italy. Further, this Dominican preacher of St. Mark's claimed to be a special messenger from God, to be the recipient of divine revelations, to see visions, and to have the gift of prophecy. He foretold the death of the pope, the king of Naples, and his patron Lorenzo. When the latter was on his deathbed (1492) Savonarola refused to grant him

Girolamo Savonarola.

absolution unless under conditions which the prince refused. After the death of Lorenzo and the expulsion of his son Piero, Savonarola put himself at the head of those who demanded a more democratical form of government; and such was now his commanding influence in Florence that he organized the distracted city into a form of republic, with two councils and a governing signory. But in his zeal, not content with revolutionizing Florence, he meditated the reform of the Roman court and of the irregularities of the clergy. To this end he wrote to the Christian princes, declaring that the church was corrupt, and that it was their duty to convoke a general council. Alarmed at this, Alexander VI., who was then pope, excommunicated him in 1497, and the bull was read in the cathedral at Florence. But besides the papal and political influences which were now arrayed against Savonarola, his innovations in St. Mark's and other monasteries had excited the enmity of the monks, especially the Franciscans. In these circumstances Francesco di Puglia, a Franciscan friar, challenged Savonarola to test the truth of his divine pretensions by passing with him through the ordeal of fire. This Savonarola declined; scenes of tumult and riot arose; St. Mark's was stormed by an infuriated mob and Savonarola cast into

prison. As the result of the mock trial with torture which followed in 1498, Savonarola, with two of his companions, was strangled and then burned. His writings consist of some theological works, a treatise on the Government of Florence, and numerous sermons.

Savoy, one of the cultivated forms of the cabbage (*Brassica oleracea*) which has a firm head and crinkled leaves. It is good for winter use, and is best after a slight frost.

Savoy, DUCHY OF (Italian, *Savoja;* French, *Savoie*), formerly a division of the Sardinian Kingdom, now forming two of the departments of France; bounded on the north and north-east by Switzerland, on the east and south-east by Piedmont, and on the south and west by the French departments of Isère and Ain. Savoy belongs entirely to the basin of the Rhone, and is bounded on the north by the Lake of Geneva. The climate is in general cold, the winters are long and severe, and the summers frequently follow without an intermediate spring. The vine is cultivated with success, but the chief riches of the country are in its cattle and dairy produce. By treaty (1860) Savoy was ceded by Sardinia to France (see *Sardinia, Kingdom of*), of which it now forms two departments, Savoie, area 1769 square miles, pop. 267,428, and Haute Savoie, area 1314 square miles, pop. 275,018. The capital of the former is Chambéry, of the latter Annecy.

Savoy, HOUSE OF, one of the oldest royal houses of Europe, now represented by the King of Italy. Humbert White Hand (Umberto Blancamano), the reputed descendant of Wittekind, the last of the Old Saxon kings, was the first of the family who took a prominent place among the princes of Northern Italy. The family dominions continued to increase, and under Amadeus II. (1103–49) were raised to a county of the empire (1111), and now received the name of Savoy. Count Thomas I. (1188–1233) obtained important accessions of territory in Chambéry, Turin, Vaud, &c. Amadeus IV. (1233–53) obtained the submission of the city of Turin to his rule. Amadeus VI. lent his aid to the Greek emperor, John Palæologus, against the Turks and the Bulgarians, and united the lordships of Cherasco, Coni, Gex, and Valromey to his possessions. His son, Amadeus VII. (1383–91), forced the Count of Provence to cede to him Nice and Vintimiglia. Amadeus VIII., grandson of the preceding (1391–1451), received the ducal title from the Emperor Sigismund in 1416, and acquired the county of Geneva, together with Bugey and Vercelli. The elder male line became extinct in 1496, and the crown devolved on the nearest collateral heirs, Philibert II. (1497–1504) and his brother Charles III. (1504–53). The latter aided the Emperor Charles V. against Francis I. of France, and was finally deprived of all his territories by the French king. But his son Philibert Emmanuel, surnamed the Iron Head (1553–80), succeeded in gaining back the greater part of the paternal domains. Charles Emmanuel I. (1580–1630) was prompted to reconquer the marquisate of Saluzzo, but Henry IV. of France invaded Savoy and Piedmont, and compelled the duke to give up Bugey, Valromey, and Gex. His son, Victor Amadeus I., regained these possessions, and added to them Montferrat, Alba, and some other places. Victor Amadeus II. (1675–1730), grandson of the first of that name, at the beginning of the war of the Spanish Succession sided with France, but afterwards transferred his services to Austria. By the Treaty of Utrecht (1713) he received a part of the Duchy of Milan, along with the island of Sicily, which conferred upon him the title of king; but in 1720 he was compelled to give up Sicily to Austria in exchange for Sardinia, which, along with Savoy, Piedmont, and his other dominions, became the Kingdom of Sardinia. See *Sardinia, Kingdom of.*

Savoy, THE, a district of London, between the Strand and the Thames Embankment, site of the Savoy Palace, built by Simon de Montfort, Earl of Leicester, in 1245, and afterwards given to Peter of Savoy, uncle of Eleanor, queen of Henry III. It was burned by Wat Tyler in 1381, but restored as a hospital by Henry VII. in 1505, and suffered various vicissitudes up to its demolition in 1817–19. The *Chapel of the Savoy* (early 16th century), which at one time enjoyed the privilege of sanctuary, after being injured by fire, was restored at the expense of Queen Victoria. It is one of the chapels-royal, but is used as a district church.

Savoy Conference, an ecclesiastical conference held in 1661 at the Savoy Palace (see above) between Episcopalian and Presbyterian divines. The proposal made by the Presbyterians was, that the conference should adopt Bishop Ussher's scheme of presbyteries, synods, and assemblies as the basis of negotiations, but to this it was replied that the commission was not empowered to

deal with church government. The two parties finally separated at the end of four months without coming to a single resolution. The government passed in the following year the famous act of uniformity, the stringent clauses of which drove about 2000 clergymen from the Anglican Church.

Savu, SAVOU, or SAVOE, an island of the Malay Archipelago south-west of Timor; area, 237 square miles. It yields millet, maize, sugar-cane, cotton, tobacco, &c., and its Malayan inhabitants are subject to the Dutch government of Timor. Pop. 35,000.

Sawantwa'ri, a native state in the Bombay Presidency, situated about 200 miles south of Bombay, bounded north and west by the British district of Ratnagiri, and on the south by the Portuguese territory of Goa; area, 900 sq. miles. Pop. (mostly Hindu), 174,433.

Saw-fish, a fish (*Pristis antiquorum*) nearly related on the one hand to the sharks, and on the other to the rays. It attains a length of from 12 to 18 feet, has a long beak or snout, with spines projecting like teeth on both edges, armed with which it is very destructive to shoals of small fishes, and is said to attack and inflict severe and even mortal injuries on the large cetaceans or whales.

Saw-flies, a group of insects belonging to the order Hymenoptera, and distinguished by the peculiar conformation of the ovipositor of the females, which is composed of two broad plates, with serrated or toothed edges, by means of which they incise the stems and leaves of plants, and deposit their eggs in the slits thus formed. The turnip-fly (*Athalia centifolia*) and the gooseberry-fly (*Nematus grossulariæ*) are examples.

Saw-fly.
a, Turnip saw-fly (*Athalia centifolia*). *b*, Ovipositor of saw-fly magnified to show the saw.

Saws are instruments with a dentated or toothed edge employed to cut wood, stone, ivory, or other solid substance, and are either straight or circular. In form and size they vary from the minute surgical or dental tool to the large instrument used in saw-mills. The *cross-cut saw*, for cutting logs transversely, is a large straight saw wrought by two persons, one at each end. The *ripping-saw*, *half-ripper*, *hand-saw*, and *panel-saw* are saws for the use of one person, the blades tapering in length from the handle. *Tenon-saws*, *sash-saws*, *dove-tail saws*, &c., are saws made of very thin blades of steel stiffened with stout pieces of brass, iron, or steel fixed on their back edges. They are used for forming the shoulders of tenons, dove-tail joints, &c., and for many other purposes for which a neat clean cut is required. *Compass* and *key-hole saws* are long narrow saws, tapering from about 1 inch to ½ inch in width, and used for making curved cuts. Machine saws are comprehended under three different classes—circular, reciprocating, and band-saws. The *circular saw* is a disc of steel with saw teeth upon its periphery. It is made to revolve with great rapidity and force, while the log is pushed forward against it by means of a travelling platform. The *reciprocating saw* works like a two-handled hand-saw, being driven upwards and downwards and the wood carried forward against its teeth. The *band-saw* or *ribbon-saw* consists of a thin endless saw placed like a belt over two wheels, and strained on them. The ribbon passes down through a flat sawing-table, upon which the material to be cut is laid. Saws for cutting stone are without teeth. The sawing of timber is an important industry in some countries, especially the U. States and Canada, where immense quantities of lumber are produced. Water-power is often employed to drive the machinery of the saw-mills, but steam is equally common.

Saxe (sáks), HERMANN MAURICE, COMTE DE, Marshal of France, natural son of Augustus II., king of Poland, by Aurora, countess of Königsmark, born at Dresden 1696, died 1750. At the age of twelve he joined the allied army under the Duke of Marlborough and the Prince Eugene, and was present at the sieges of Lille and Tournay. After the Treaties of Utrecht and Passarowitz he withdrew to France, and at Paris made himself intimately acquainted with professional tactics. On the death of his father he declined the command of the Saxon army, offered him by his brother Augustus III., and joined the French, with whom he distinguished himself at Dettingen and Philipsburg, and in 1744 was rewarded with the staff of a marshal of France. He was employed in the war that followed the death of the Emperor Charles VI., and in 1745 gained the famous battle of Fontenoy. In 1747 he was victorious at Laufeldt, and in the following year took Maestricht, soon after which the Peace of Aix-la-Chapelle was concluded. He wrote a treatise entitled Mes Rêveries, on the art of war.

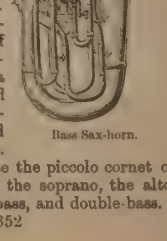
Saxe, John Godfrey, American litterateur, born 1816, died 1887. He studied law, but ultimately took to journalism and literature. His poems, many of which are of a humorous character, have been very popular in America. They include Progress, a Satirical Poem (1846); Humorous and Satirical Poems (1850); Money King (1859); Flying Dutchman (1862); Clever Stories of Many Nations (1865); The Masquerade (1866); Fables and Legends (1872); and Leisure Day Rhymes (1875).

Saxe-Altenburg (saks-al'tèn-burg; German, *Sachsen-Altenburg*; zàk'sèn-àl'tèn-burh), an independent duchy in Thuringia, forming one of the states in the German Empire, is divided into two nearly equal portions by a part of Reuss, and is bounded on the S.W. by the Grand-duchy of Saxe-Weimar-Eisenach, on the N. by Prussia, and on the E. by Saxony; area, 510 square miles. The eastern or Altenburg division is very fertile, while the western or Saal-Eisenburg portion is hilly and wooded. The duchy is represented by one vote in the Bundesrath and one vote in the Reichstag of the German Empire. The capital is Altenburg. Pop. 161,460.

Saxe-Coburg-Gotha (saks'ko-burg-gō-ta; German, *Sachsen-Koburg-Gotha*), a duchy of Central Germany, one of the states of the German Empire, comprising the province of Gotha, lying between Prussia, Schwarzburg, Meiningen, and Weimar; and the province of Coburg, lying between Meiningen and Bavaria; Coburg 218 square miles, and Gotha 542 square miles. The south of Gotha and north of Coburg are both mountainous. Both divisions are fertile; the hills are covered with wood, and in Gotha coal and other minerals are found. The chief occupations of the inhabitants, particularly in Coburg, are cattle-rearing and agriculture. In Gotha there are manufactures of linen, leather, metal-wares, &c. The government is a constitutional monarchy, and each province has its own elective assembly, while the duchy sends one member to the Bundesrath and two to the Reichstag of the German Empire. For affairs common to both divisions the assemblies meet conjointly at Coburg and at Gotha alternately, the two chief towns of the duchy. The ducal house and the greater part of the population profess the Lutheran faith. The late Prince Consort was the younger brother of the late duke (Ernest II.), who was succeeded in the dukedom by Prince Alfred of Great Britain, duke of Edinburgh. Pop., Coburg, 62,498; Gotha, 154,105; total, 216,603.

Saxe-Meiningen (saks-mī'ning-en; German, *Sachsen-Meiningen*), a duchy of Central Germany, and one of the states of the German Empire, consisting of a main body, and several minor isolated portions. Area, 955 square miles. The greater part of the surface is hilly, and the principal crops are oats, buckwheat, potatoes, turnips, hemp; and the pastures rear considerable numbers of cattle, sheep, and horses. The minerals include iron and copper, worked to a small extent, and the manufactures are chiefly ironware, porcelain, glass, &c. The government is a hereditary and constitutional monarchy, and the great majority of the inhabitants are Lutherans. The duchy sends one member to the Bundesrath and two to the Reichstag of the German Empire. The capital is Meiningen. Pop. 234,005.

Saxe-Weimar, or Saxe-Weimar-Eisenach (saks-wī'mär; German, *Sachsen-Weimar-Eisenach*; zàk'sèn-vī-mär-ī'zn-àh), a grand-duchy of Central Germany, one of the states of the German Empire, and consisting of three larger portions, Weimar, Neustadt, and Eisenach, and twelve smaller parcels. Area of the whole, 1421 square miles. The forests are very extensive, and form the principal wealth of the grand-duchy. The minerals are unimportant. In Eisenach woollen, cotton, and linen tissues, ribbons, and carpets, &c., are made. The chief town is Weimar, and there is a university of considerable repute at Jena. The government is constitutional, the legislative power being vested in a house of parliament, consisting of one chamber of thirty-one members. Saxe-Weimar sends one member to the Bundesrath and three to the Reichstag of the German Empire. Pop. 339,217.


Bass Sax-horn.

Sax-horn (after M. *Sax*, of Paris, the inventor), a name of several brass wind-instruments, with a wide mouthpiece and three, four, or five pistons, much employed in military bands. These horns comprise the piccolo cornet or high small sax-horn, the soprano, the alto, the tenor, baritone, bass, and double-bass.

Saxic'ava, a genus of marine lamellibranchiate molluscs, remarkable for excavating burrows in rock to serve as their habitations.

Sax'ifrage, a popular name of various plants, the saxifrages proper belonging to the genus *Saxifrăga*, of the nat. order Saxifragaceæ. The species are mostly inhabitants of alpine and subalpine regions of the colder and temperate parts of the northern zone. Most of them are true rock plants, with tufted foliage and panicles of white, yellow, or red flowers; and many are well known as ornamental plants in our gardens, as *S. umbrōsa*, London pride or none-so-pretty; *S. granulāta*, white or granulated meadow saxifrage; *S. hypnoides*, mossy saxifrage or ladies' cushion; *S. crassifolia*, or thick-leaved saxifrage; *S. sarmentōsa*, or Chinese saxifrage. The genus is a large one, containing upwards of 150 species, of which at least twelve are natives of Britain.

Saxo Grammaticus (that is, Saxo the Grammarian, or the Learned), the most celebrated of the old Danish historians, who flourished in the 12th century. He is supposed to have been a native of Denmark, of which kingdom and its dependencies he compiled (in Latin) an elaborate history down to 1186. Saxo was a priest in the cathedral of Roeskilde, and died about 1208.

Saxon Architecture, the earliest stage of native English architecture, its period being from the conversion of England to Christianity till the Conquest or near it, when Norman architecture began to prevail (7th to 11th century). The few relics left us of this style exhibit its general characteristics as having been rude solidity and strength. The walls are of rough masonry, very thick, without buttresses, and sometimes of herring-bone work; the towers and pillars thick in proportion to height, the former being sometimes not more than three diameters high; the quoins or angle masonry are of hewn stones set alternately on end and horizontally; the arches of doorways and windows are rounded, or sometimes these openings have triangular heads, their jambs of long and short work carrying either rudely carved imposts or capitals with square abaci. Sometimes heavy mouldings run round the arches, and when two or more arches are conjoined in an arcade these are on heavy low shafts formed like balusters. Window openings in the walls splay from both the interior and the exterior, the position of the windows being in the middle of the thickness of the wall.

Saxon Architecture.

a, Tower of Sompting Church, Sussex. *b*, Tower of Barton-on-Humber Church, Lincolnshire. *c*, Long and short work. *d*, Window with a baluster.

Saxons (German, *Sachsen;* Latin, *Saxŏnes*), a Teutonic race whose name is generally derived from the Old German word *sahs* (a knife or short sword). They are first mentioned by Ptolemy, who speaks of them as inhabiting a district bounded by the Eider, the Elbe, and the Trave. In the 3d century of the Christian era they were a numerous, warlike, and piratical people. In the 5th century considerable hordes of them crossed from the Continent and laid the foundations of the Saxon kingdoms in Britain —Essex or East Saxons, Sussex or South Saxons, &c. (See *England* and *Anglo-Saxons.*) Those who remained in Germany (Old Saxons) occupied a great extent of country, of vague and varying limits, which bore the general name of Saxony. Charlemagne waged a thirty years' war against the Saxons; and Wittikind, their national hero, with many of his countrymen, submitted to his arms, and embraced Christianity. See *Saxony, Kingdom of.*

Saxon Switzerland, a name which has been given to part of the Kingdom of Saxony, on the Elbe, south-east of Dresden and bordering on Bohemia. It consists of a group of mountains of sandstone, with valleys and streams of the most picturesque character, in which isolated masses of sandstone, large and small, occur in very fantastic shapes. It is about 24 miles long, and equally wide.

Saxony, KINGDOM OF (German, *Sachsen*), a kingdom of Central Germany; bounded on the north-west, north, and east by Prussia, south-east and south by Bohemia, south-west by Bavaria, and west by Reuss, Saxe-Weimar, and Saxe-Altenburg; greatest length, 135 miles; greatest breadth, 75 miles; area, 5786 square miles (or rather less than Yorkshire); pop. 3,786,936. For administrative purposes it is divided into the four districts of Dresden, Leipzig, Zwickau, and Bautzen or Budissin.

General Features.—With the exception of a very small portion of the east, which sends its waters to the Baltic, Saxony belongs to the basin of the Elbe, which traverses it in a north-westerly direction for about 70 miles. Of its tributaries the most important are the Mulde and the Elster. The surface, though very much broken, may be regarded as an inclined plane, which commences in the south, in the Erzgebirge chain, and slopes towards the north. In the more elevated districts the scenery is wild, while on either side of the Elbe, from the Bohemian frontier to Pirna, is a remarkable tract, covered with fantastic sandstone formations, which has received the name of the Saxon Switzerland. On the Prussian frontiers, where the district subsides to its lowest point, the height above the sea is only 250 feet. The loftiest summits are generally composed of granite and gneiss, and are rich in mineral products. The Erzgebirge is continued by the Riesengebirge, a branch of which, under the name of the Lausitzer-gebirge, or Mountains of Lusatia, covers a considerable portion of the east of Saxony. The climate in the loftier mountain districts is very cold, but with this exception it is milder than that of most countries of Europe under the same latitude.

Productions, Industries.—The most important crops are rye, oats, barley, wheat, potatoes; and orchard-fruits, particularly apples, pears, and plums, are very abundant. Considerable attention is paid to the culture of the vine. Large numbers of horned cattle are exported. The wool of Saxony has long been celebrated for its excellence. Swine and horses are of a superior breed. The minerals are of great importance, and include silver, lead, tin, iron, cobalt, nickel, bismuth, and arsenic. Numerous seams, both of lignite and coal, are found in various districts, and are worked to a considerable extent. The quarries furnish in abundance granite, porphyry, basalt, marble, serpentine, and sandstone. Several mineral springs of reputation exist. Saxony is an important manufacturing country. The principal manufactures are cotton and woollen goods, linen, lace, ribbons, and straw-plaiting. Other industries are earthenware, Dresden ware, leather, chemicals, &c., and the printing establishments of Leipzig are well known. Saxony is connected with the great trunk lines which traverse Central Europe, and has over 1500 miles of railway.

Administration, &c.—The government is a constitutional monarchy (forming part of the German Empire), in which the executive power is lodged solely in the crown, and the legislative power jointly in the crown and two chambers. The members of both houses are paid for their services: the amount (12s. per day during the session) being the same for the members of each house. Justice is administered by three classes of courts, namely, courts of primary, secondary, and tertiary resort or instance. In religion universal toleration is guaranteed; but the religious body recognized by the state is the Lutherans. At the head of the educational establishments of the kingdom is the University of Leipzig, and there are gymnasia in the principal towns. The army is raised chiefly by conscription—all male citizens being bound to serve for three years in the active service, four years in the reserve, and five in the Landwehr. As a member of the German Empire Saxony has four votes in the Federal Council, and sends twenty-three deputies to the Reichstag. The chief towns are Dresden (the capital), Leipzig, Chemnitz, Zwickau, Plauen, and Freiberg.

History.—The present ruling family in Saxony claims descent from Wittikind, the national hero who was conquered by Charlemagne and embraced Christianity. The territory became a duchy about 880, and in the 10th century Duke Henry was elected German emperor. In 1127 the duchy passed to the Bavarian branch of the Guelf family, and after several changes Frederick the Warrior, margrave of Meissen and landgrave

of Thuringia, became (1423) Elector of Saxony. His grandsons, Ernest and Albert, in 1485 divided the family possessions, founding the Ernestine and Albertine lines respectively, the former retaining the electoral dignity. Ernest was succeeded by his sons Frederick III. (1486–1525) and John (1525–1532), but in 1548 the elector of the Ernestine line was put under the ban of the empire, and the electorate transferred to Maurice, who represented the Albertine line which now occupies the throne. Maurice was succeeded by his brother Augustus (1553–86), who made important additions to the Saxon territories by purchase and otherwise. His son, Christian I., died in 1691, leaving his crown to his son, Christian II. Christian's brother and successor, John George I. (1611–56), joined Gustavus Adolphus in the Thirty Years' war, and the Saxon forces took part at Breitenfeld and at Lützen. Frederick Augustus I. (1694–1733) embraced the Catholic religion (1697) to obtain the crown of Poland. Frederick Augustus II. also obtained the Polish crown (as Augustus III.) after a war with France and joined with Austria in the Seven Years' war. Frederick Augustus III. (1763–1827) reluctantly took part against France when war was declared by the imperial diet in 1793, but after the battle of Jena the elector and his army fought side by side with the French. Napoleon conferred upon him the title of king, and large additions were made to the Saxon territory in 1807 and 1809. In 1813 Saxony was the scene of Napoleon's struggle with the allies, and the battles of Lützen, Bautzen, Dresden, and Leipzig were followed by the Congress of Vienna (1814), when a large part of the dominions then under the Saxon monarch was ceded to Prussia. A period of great progress followed, interrupted somewhat at the revolutionary period of 1848–49. In the Austro-Prussian war of 1866 Saxony took part with Austria, and was occupied by the Prussian troops. Prussia desired to incorporate the kingdom, but Austria, supported by France, opposed this arrangement, and Saxony was admitted into the North German Confederation instead. In the Franco-German war Saxony united with the rest of Germany against France; and the present King Albert (then crown-prince) was commander of the German army of the Meuse.

Saxony, Prussian, a province of the Prussian monarchy, of irregular shape, and with isolated districts, almost in the centre of Germany, to the north of the Kingdom of Saxony; area, 9729 square miles. Originally a part of Saxony, it was given to Prussia by the Congress of Vienna (1814). The northern and large portion belongs to the North German plain; the southern and south-western is elevated or hilly, partly belonging to the Hartz Mountain system, and containing the Brocken (3742 feet). The chief river is the Elbe. The soil is generally productive, about 61 per cent being under the plough and 20 per cent forests. Beet sugar is largely produced. The mineral products are valuable, particularly lignite, salt, kainite, and other potash salts. The capital of the province is Magdeburg; other towns are Halle (with a university), Erfurt, and Halberstadt. Pop. 2,698,712.

Say, Jean Baptiste, political economist, born at Lyons 1767, died 1832. He was destined by his father for a commercial career, and passed a part of his youth in England. On his return to France he was for some time secretary to Clavière, the minister of finance, and from 1794 to 1800 conducted a journal called the Décade. In 1799 he was a member of the tribunate, but being removed by Napoleon devoted himself to industrial pursuits. In 1819 he was appointed professor of industrial economy at the Conservatoire des Arts et Métiers, and in 1831 was nominated to the chair of political economy at the Collége de France. His chief works are his Traité d'Économie politique, and his Cours complet d'Économie politique pratique.

Say, Jean Baptiste Léon, French statesman and economist, grandson of the above, born at Paris 1826. He was returned to the National Assembly in 1871, and in the following year became finance minister in the government of M. Theirs. He occupied this position in successive ministries; was appointed ambassador to London in 1880, was afterwards president of the senate, but latterly a deputy. His works include Histoire de la Caisse d'Escompte; Les Finances de la France; Les Solutions Démocratiques de la Question des Impôts, &c. Died in 1896.

Sayce, Archibald Henry, D.D., LL.D., English comparative philologist and orientalist, born 1846. He was educated at Bath and Oxford, where he became a fellow and tutor of Queen's College. From 1878 to 1890 he was deputy professor of comparative philology under Max Müller. He was a member of the Old Testament Revision Company, and was Hibbert Lecturer (1887).

He is the author of many works on philology and on oriental languages, including Principles of Comparative Philology; Introduction to the Science of Language; Ancient Empires of the East; Assyria, its Princes, Priests, and People; Assyrian Grammar; Lectures on the Origin and Growth of Religion; Records of the Past; &c.

Scab, a skin disease in sheep, analogous to itch in man and mange in horses and dogs, usually propagated by contagion, and caused by the presence of minute acari, which burrow under the skin. Various medicines have been recommended, such as lard or palm-oil, 2 lbs.; oil of tar, ½ lb.; sulphur, 1 lb., mixed together and rubbed on the diseased spots.

Scabbard-fish (the *Lepidopus caudatus*) a beautiful fish found in the Mediterranean and Eastern Atlantic, so called because in shape it bears some resemblance to the sheath of a sword. It is of a bright silvery whiteness, with a single dorsal fin running along the back.

Sca'bious (*Scabiōsa*), an extensive genus of annual and perennial herbs, belonging to the natural order Dipsaceæ. They are annual or perennial herbs, with entire or divided leaves and heads of blue, pink, white, or yellowish flowers. *S. succīsa*, devil's bit, is a common British plant. It possesses great astringency but no important medicinal virtues, although it was formerly supposed to be of great efficacy in all scaly eruptions, hence the name.

Scad, or HORSE-MACKEREL (*Trachūrus trachūrus*), a genus of teleostean fishes included in the family Scombéridæ or mackerels, and found around the coasts of Britain. It appears in large shoals, and the flesh, although coarse, is esteemed and eaten salted during the winter months.

Scævola. See *Mucius Scævola.*

Scafell (skă'fel), or SCAW FELL, a mountain of England, in the south of the county of Cumberland, near the borders of Westmoreland, consists of two principal summits, separated from each other by a deep chasm. Of the two peaks the higher is 3229 feet, the other 3092 feet in height.

Scagliola (skăl-yi-ō'lă), a composition, imitative of marble, used for enriching columns and internal walls of buildings. It is composed of gypsum, or sulphate of lime, calcined and reduced to a fine powder, with the addition of water, by which a fine paste is made. While soft it is bestudded with splinters of spar, marble, granite, bits of concrete, coloured gypsum, or veins of clay, in a semi-fluid state. It is smoothed with fine iron tools when soft, and when it becomes hard receives a high polish like marble.

Scala-Nova, Turkish, KUSHADASSI, a seaport town in Asiatic Turkey, at the head of the gulf of same name, 40 miles south of Smyrna. The ruins of Ephesus are in the neighbourhood. Population about 10,000.

Scala'ria, a genus of marine, turreted, gasteropodous mollusca, with raised ribs or ridges on their shells. They are found in sandy mud, at depths varying from 7 to 13 fathoms, and are commonly called wentle-traps.

Scald-fish, a marine flat-fish, *Rhombus Arnoglossus*, allied to the turbot, sole, and flounder. It is not uncommon on the British coasts.

Scald-head, a fungous parasitic disease of the scalp. See *Favus.*

Scalds. See *Burns and Scalds.*

Scalds, or SKALDS, were the poets and historians of the Scandinavian race. They sang the praises of the gods, and celebrated the exploits of the national heroes. A list of 230 of the most distinguished is still preserved in the Icelandic language.

Scale, a mathematical instrument consisting of a slip of wood, ivory, or metal, with one or more sets of spaces graduated and numbered on its surface for measuring or laying off distances, &c.

Scale, in music, a succession of notes arranged in the order of pitch, and comprising those sounds which may occur in a piece of music written in a given key. In its simplest form the scale consists of seven steps or degrees counted upward in a regular order from a root or prime (the tonic or key-note), to which series the eighth is added to form the octave. It has been the practice among musicians to consider the scale having C for its key-note as the natural, model, or normal scale. The diatonic scale ascends by five steps (tones) and two half-steps (semitones), taking for the names of the notes the syllables do, re, mi, fa, sol, la, si, do; the two semitones occur between E and F (mi and fa) and B and C (si and do). When the scale is graduated all the way by a series of twelve half-steps or semitones it is called the chromatic scale. A scale is said to be major when the interval between the key-note and the third above it, as from C to E, consists of two tones; it is called minor when the interval between the key-

note and its third, as from A to C, consists of a tone and a half. See *Music.*

Scale-fern, a popular name for a fern of the genus *Ceterach* (*C. officinārum*), so named from the imbricated tawny scales at the back of the fronds. To this plant was formerly attributed a marvellous influence over the liver and spleen. It is a British species, and is said to be used as a bait for fish on the coast of Wales.

Scale-insect, a name given to various insects of the Coccus family injurious to plants. See *Coccus.*

Scale-moss, a popular name given to the Jungermannias, plants resembling moss, and belonging to the order Hepaticæ. They grow on the trunks of trees, in damp earth, and in similar places, and are so called from the small scale-like leaves.

Scalene', in mathematics, a term applied to a triangle of which the three sides are unequal. A cone or cylinder is also said to be scalene when its axis is inclined to its base, but in this case the term *oblique* is more frequently used.

Scales, the imbricated plates on the exterior of certain animals, as the pangolins

Scales of Fishes.

1, Ctenoid Scale of the Perch. 2, Cycloid Scale of the Carp. 3, Ganoid Scales of Dipterus. 4, Placoid Scale of Ray.

or scaly ant-eaters, serpents and other reptiles, and especially fishes. The scales of the latter are developed beneath the true epiderm, and consist of alternate layers of membrane, of horny matter, and occasionally of phosphate of lime. Fishes are sometimes classed, in accordance with the structure of their scales, into Ctenoid, Ganoid, Cycloid, and Placoid, the general appearance and character of which are well shown in the accompanying figures. (See also the separate terms.) The term scale is applied also in botany to a small rudimentary or metamorphosed leaf, scale-like in form and often in arrangement, constituting the covering of the leaf-buds of the deciduous trees in cold climates, the involucrum of the Compositæ, the bracts of catkins, &c.

Scale-tail. See *Anomalure.*

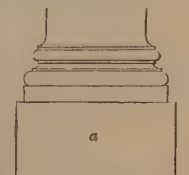
Scaliger (skal'i-jėr), JOSEPH JUSTUS, son of Julius Cæsar Scaliger, born at Agen in France, in 1540, died in 1609. His training as a scholar was largely due to his father, after whose death he went, at the age of nineteen, to Paris, where he studied Greek, Hebrew, Syriac, Persian, and most of the modern European languages. For some time he led an unsettled life, visiting Italy and England in his search for manuscripts. Having become a Protestant he retired from France after the massacre of St. Bartholomew, and was made professor in the Academy at Geneva, but returned to France in 1574, and lived there for the next twenty years. In 1593 he was appointed to the chair of polite literature in the University of Leyden, and remained there until his death. Of his numerous works, the treatise De Emendatione Temporum, is one of the most important. In this work he gave the first complete and scientific chronological system. His annotations to Theocritus, Nonnus, Catullus, Tibullus, Propertius, Seneca (tragedies), Varro, Ausonius, Festus, are characterized by an excessive subtlety and over-free treatment of the text.—SCALIGER, JULIUS CÆSAR, father of the above, was born in 1484, and resided in Venice or Padua till his forty-second year, occupied with study and the practice of medicine. His writings gave him a high rank among the scholars of his age, although the boldness of some of his works rendered his faith suspected. He died 1558. Both father and son gave rise to much ridicule on account of their vanity and irritability. The work of neither is commensurate with his fame.

Scallop. See *Pecten.*

Scalp, the outer covering of the skull, composed of skin and of the expanded tendon of the occipito-frontal muscle, and of intermediate cellular tissue and blood-vessels. Hence the skin of the head or a part of it, with the hair belonging to it, torn or cut off by the American Indians as a mark of victory over an enemy.

Scaly Ant-Eater. See *Pangolin.*

Scaman'der, a small stream in the Troad, in the north-west of Asia Minor, associated with the little river Simois in the story of the Trojan war.



a, Scamillus.

Scamil'lus, in ancient architecture, a sort of second plinth or block under a column, statue, &c., to raise it, but not, like a

pedestal, ornamented with any kind of moulding.

Scam'mony, a plant of the genus *Convolvulus*, the *C. Scammonia*, which grows abundantly in Syria and Asia Minor. It resembles the common bindweed (*C. arvensis*), but is larger, and has a stout tap-root, from which the drug scammony is extracted. This is the inspissated sap of the root, of a blackish gray colour, a nauseous smell, and a bitter and acrid taste. It is used in medicine as a drastic purge, and usually administered in combination with other purgatives in doses of three or four grains.—*French* or *Montpellier scammony* is a substance made in the south of France from the expressed juice of *Cynanchum monspeliacum* (order Asclepiadaceæ), mixed with different resins and other purgative substances.

Scanderbeg (that is, *Alexander Bey*), prince of Albania, whose proper name was George Castriota, son of John, prince of that country, was born about the year 1404, died 1467. As a boy he was sent as a hostage and educated at the Turkish court. At the age of eighteen he was placed at the head of a body of troops, but hearing of the death of his father Scanderbeg renounced Mohammedanism and raised the standard of insurrection in Albania. He repeatedly defeated the Ottoman forces, and Mohammed II. found it necessary (1461) to accept terms of peace. After his death Albania again fell under Turkish dominion.

Scandinavia, the ancient name of the region now comprehending the three northern kingdoms, Denmark, Sweden, and Norway, or Sweden and Norway alone, and still not uncommonly used. These countries were inhabited in the earliest times by people of the Teutonic stock, and B.C. 100 the natives of Jutland and Schleswig became formidable to the Romans under the name of *Cimbri*. But it was chiefly in the 9th century that they made their power felt in the western and southern parts of Europe, where hordes of Northmen or Vikings, as they were sometimes called, made repeated raids in their galleys on the coasts of England, Scotland, Ireland, Holland, Germany, France, Spain, and Italy, where they plundered, destroyed, and sometimes founded new states. (See *Northmen*.) The Old Norse or Scandinavian literature, so far as extant, is of considerable value, having preserved to us not only the old versification peculiar to all nations of Teutonic origin, but also the mythology, history, and laws of the pagan period of these northern countries. Among the most valuable remains are the Edda and the Sagas (which see). For the ancient mythology see *Northern Mythology*.

Scandix, a small genus of plants, nat. order Umbelliferæ. It is composed of annual herbs with striated stems, bipinnate leaves, the leaflets divided into linear lobes, and small umbels of white flowers which are succeeded by slender long-beaked fruits. *S. Pecten-Veneris* (needle chervil, shepherd's needle or Venus's comb) is found in Britain.

Scanso'res, an order of birds, popularly known as climbing birds, having the feet provided with four toes, of which two are turned backwards and two forwards. Of the two

Scansores.

a, Head and foot of Cuckoo. *b*, Do. of Green Woodpecker. *c*, Do. of Great Jacamar.

toes which are directed backwards one is the hallux or proper hind-toe, the other is the outermost of the normal three anterior toes. This conformation of the foot enables the scansores to climb with unusual facility. Their food consists of insects and fruit; their nests are usually made in the hollows of old trees. The most important families are the cuckoos (Cuculidæ), the woodpeckers and wry-necks (Picidæ), the parrots (Psittacidæ), the toucans (Ramphastidæ), the trogons (Trogonidæ), the barbets (Bucconidæ), and the plantain-eaters (Musophagidæ). Not all of this order are actually climbers, and there are climbing birds which do not belong to this order.

Scape, in botany, an unbranched stem, or rather peduncle, rising from the root and bearing the fructification without leaves, as in the narcissus and hyacinth.—In archi-

tecture, the spring of a column; the part where a column springs from its base, usually moulded into a concave sweep or cavetto.

Scape-goat, in the Jewish ritual, a goat which was brought to the door of the tabernacle, where the high-priest laid his hands upon him, confessing the sins of the people, and putting them on the head of the goat, after which the goat was sent into the wilderness, bearing the iniquities of the people. Lev. xvi.

Scap'ula, or SHOULDER-BLADE, the bone which in most mammalia forms the chief bone of the shoulder girdle, and which chiefly supports the upper limb on the trunk or axial skeleton. In man the scapula exists as a flattened bone of triangular shape, which lies on each side of the body, on the back, and towards the upper and outer border of the chest or thorax. The internal surface of the scapula is concave, and is applied against the ribs. The outer or dorsal surface is divided into two portions by a strong ridge which runs obliquely across the bone.

Scap'ulary, a kind of garment or portion of dress, consisting of two bands of woollen stuff—one going down the breast and the other on the back, over the shoulders—worn by a *religieux*. The original scapular was first introduced by St. Benedict, in lieu of a heavy cowl for the shoulders, designed to carry loads.

Scarabæ'us, an extensive genus of coleopterous insects, placed by Linnæus at the head of the insect tribes, and answering to the section Lamellicornes of Latreille. They are sometimes called *dung-beetles*, from their

Scarabæus sacer, or Sacred Beetle.

habit of inclosing their eggs in pellets of dung, which are placed in holes excavated for their reception. The *S. sacer*, or sacred beetle of the Egyptians, was regarded with great veneration; and figures of it, plain or inscribed with characters, were habitually worn by the ancient Egyptians as an amulet. Large numbers of these *scarabæi* or scarabs, made of hard stone or gems, are still found in Egypt, often inscribed with hieroglyphics. Some of the carved scarabs are three or four feet long. The beetle itself was also embalmed.

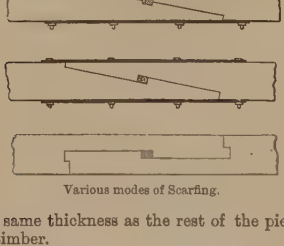
Scar'amouch, a personage in Italian comedy, imported originally from Spain, whose character was compounded of traits of vaunting and poltroonery. His costume was black from top to toe, he wore a black *togue* (kind of square-topped cap), a black mantle, and had on his face a mask with openings. In France the scaramouch was used for a greater variety of parts.

Scarborough, a municipal and parliamentary borough and seaport, England, county of York (North Riding), is beautifully situated on two open sandy bays separated by a bold promontory of rock 300 feet high, on the North Sea, 39 miles north-east of York. The main part of the town is south of this promontory and a deep valley divides it, and is bridged over from St. Nicholas Cliff to the South Cliff. Scarborough has a town-hall, market-hall, custom-house, assembly-rooms, public rooms, a theatre, some large hotels, several hospitals, a fine aquarium, a museum, spa saloon, &c. It is much frequented for sea-bathing and for its mineral waters, which contain carbonate and sulphate of lime, magnesia, and oxide of iron. There is a fine sea-wall, forming an agreeable promenade, also a promenade pier on the north side of the town. Scarborough harbour is much used by the fishing-fleets, and though confined at the entrance is easy of access, and safe and commodious. The castle, which stands on the dividing promontory, was erected about 1136, and is a conspicuous object to the seaward. The cliff on which it stands is exposed to a steady and rapid denudation by the sea. Scarborough carries on a limited foreign trade, principally with France, Holland, and the Baltic. Ship-building, rope and sail-cloth making, the manufacture of jet ornaments, and the fisheries give employment to many of the inhabitants. The borough sends one member to parliament. Pop. 33,776.

Scar'broite, a mineral of a pure white colour, void of lustre, and composed of alumina, silica, ferric oxide, and water, occurring as veins in the beds of sandstone covering the calcareous rock near Scarborough (whence the name).

Scarfing, a particular method of uniting two pieces of timber together by the extremities, the end of one being cut or

notched so as to fit into the other, making the part where the junction takes place of



Various modes of Scarfing.

the same thickness as the rest of the pieces of timber.

Scarification, the operation of making several incisions in the skin with a lancet or scarificator for the purpose of taking away blood, letting out fluids, &c.; or the removal of flesh about a tooth in order to get at it the better with an instrument.

Scarificator, an instrument used in scarification or cupping. It consists of ten or twelve lancets in a sort of box or case, which are discharged through apertures in its plane surface by pulling a kind of trigger, so that in passing they make a number of incisions in the part to which the instrument is applied.

Scarlatti, Alessandro, Italian musician, born at Naples 1650, was educated at Rome under Carissimi, and after residing some time in Germany and at Rome, passed the last years of his life at Naples, where he died in 1725. He was the creator of modern opera, and wrote much church music.

Scarlet, a beautiful bright red colour, brighter than crimson. The finest scarlet dye is obtained from cochineal.

Scarlet Bean, or Scarlet Runner, a twining plant, the *Phaseŏlus multiflōrus*, a native of Mexico, cultivated as a green vegetable for its long rough pods or as an ornamental plant.

Scarlet Fever, or Scarlatina, is an extremely infectious disease, not confined to, but common among children. In ordinary cases the beginning of the disease is indicated by great heat and dryness of the skin, shivering, headache, sickness, and sore throat. Another symptom is that the tongue is coated with a white fur through which numerous red points stand up, from which appearance it is called the 'strawberry tongue.' On the second day of the fever a rash appears and quickly spreads over the whole body, begins to fade on the fifth day, and disappears before the end of the seventh. After the rash has gone the skin begins to be shed in large flakes, and this continues about five weeks. During this latter stage the disease is most infectious. At the first symptoms the patient should receive a dose of castor-oil, and then be put in a warm bath. When the fever has gone, strengthening food and frequent bathings should be given, and an equal temperature in the room observed.

Scarlet Fish, a species of carp found in Chinese waters, and thus named because of its colour. The eyes in these fish are exceedingly prominent, and the fins are double.

Scarp, in fortification, the interior slope or talus of the ditch next the fortified place and at the foot of the rampart. See *Fortification*.

Scarpanto (ancient *Carpathos*), an island of the Mediterranean, 28 miles south-west of Rhodes, 27 miles in length and about 6 broad. It contains quarries of marble and mines of iron, and has several harbours. Pop. 5000.

Scarron, Paul, French comic author, born at Paris 1610, died 1660. His father was a councillor of the parliament and a man of considerable means, and Scarron was educated for the church. Before he was thirty he suffered from ailments that left him paralytic and decrepit for the rest of his life. After suffering from poverty he received a pension from the queen and one from Mazarin, but his hostility to the latter and his writings in favour of the *Fronde* lost him both patrons. He maintained himself, however, by working for the booksellers, and having at last received part of his paternal inheritance, he entertained at his house the brilliant literary society of Paris. In 1652, when almost wholly paralysed, he married Françoise d'Aubigné, a young girl of considerable beauty, and afterwards known as the famous Madame de Maintenon. Of Scarron's numerous writings the best is the Roman Comique (1651); and of his plays Jodelet (1645) and Don Japhet d'Arménie (1653) have still considerable literary value.

Scarus, a genus of fishes of the family Labridæ. See *Parrot-fish*.

Scattery Island, an islet in the mouth of the Shannon, 3 miles south-west of Kilrush. It contains a fort, three small churches, an

ancient tower, and a lighthouse, the light of which is seen 10 miles.

Scaup Duck, a species of duck, the *Fuligŭla marila*. It is common in North America and the north of Europe; and is found in considerable numbers on the British coasts during the winter months. It feeds on small fish, molluscs, and hence its flesh is coarse.

Scepticism (Greek, *skepsis*, reflection, doubt), in the wide sense, that condition of mental conflict in the search for truth which involves suspension of judgment before opposing testimony. Specifically, however, it has been applied to the doctrines of the Greek philosophers called Pyrrhonists, whose scheme of philosophy denied the possibility of knowing anything with certainty. Pyrrho of Elis (360–270 B.C.), although he himself left no writings, was the founder of this school. Chief among his immediate disciples was Timon of Phlius, who taught that appearances are neither false nor true, that logical reasoning has no adequate sanction, and that imperturbability is the only possible attitude before the facts of life. This position was maintained by the founders of the Middle Academy, Arcesilaus and Carneades, who employed this philosophy of doubt against the dogmatism of the Stoics. Arcesilaus, who lived about 315–241 B.C., held that the report of our senses is untrustworthy. Carneades (213–129 B.C.) declared absolute knowledge to be impossible, and was the author of the doctrine of probability. To the later sceptical school of the 1st century B.C. belongs Ænesidemus of Cnossus, who expressed his doctrine of negation in ten tropes. These were reduced to five by Agrippa, the first of which is connected with the irreconcilability of human testimony; the second is based on the principle that every proof requires to be itself proved; the third that knowledge varies according to the conditions under which it is acquired; the fourth forbids the assumption of unproved opinion; and the fifth seeks to discredit the reciprocal method of proof in which one thing is proved by another and then the second adduced to prove the first. In later times Al-Ghazzali (1059–1111) taught at Bagdad a philosophic scepticism to enforce the truth of his Mohammedan doctrine. In this method he was followed by Pascal (1623–1662), who sought to establish the necessity of Christian faith by a sceptical exposure of the fallacy of human reason. Among modern sceptics may be mentioned Montaigne, Bayle, D'Alembert, and Hume. The latter limited the range of human reasoning to human experience, and affirmed that any knowledge concerning God or a future state transcends the scope of our faculties. See *Agnostics*.

Sceptre, a staff or baton borne by a monarch or other ruler, as a symbol of office or authority; a royal or imperial mace.

Schabzieger (shâp'tsē-gĕr), a kind of green cheese made in Switzerland, to which a special flavour is communicated by the plant *Melilōtus cærulea* (blue melilot).

Schadow (shâ'dō), JOHANN GOTTFRIED, sculptor, born at Berlin 1764, died 1850. He early showed a liking for the fine arts, and studied drawing and sculpture in his native city until he went to Italy, where he wrought from 1785 to 1787 in the museum of the Vatican and of the Capitol. His first great work was the monument erected in the Dorothea Church, Berlin, to the memory of the Count of the Mark, and this was followed by the colossal statue of Ziethen; the statue of Frederick the Great in Stettin; of Leopold of Dessau in Berlin; of Blücher in Rostock; the Tauenzien monument in Breslau; of Luther in Wittenberg, &c. Three sons of Schadow devoted themselves to art. The eldest, RUDOLF, born in 1785, gained some reputation as a sculptor, and died at Rome in 1822; the second, FRIEDRICH WILHELM, born 6th September, 1789, became a painter of considerable eminence, and was ennobled in 1843; and the third son, FELIX, likewise became a painter.

Schaff (shâf), PHILIP, D.D., biblical scholar, born in Switzerland in 1819. He studied at Tübingen, Halle, and Berlin; lectured in the latter university in 1842–44, and then went to America, where he was professor in the theological seminary of the German Reformed Church at Mercersburg (Pa.) from 1844 to 1863. In 1864–69 he was lecturer in several theological institutions, and in 1869 he became a professor in Union Theological Seminary, New York. He died in 1893. He was a prolific writer, his works including History of the Apostolic Church; History of the Christian Church; Creeds of Christendom; Religious Encyclopedia (as editor); &c.

Schaffhausen (shâf'hou-zn), a town of Switzerland, capital of the canton of same name, situated on the right bank of the Rhine, 24 miles north of Zürich. It is remarkable for the antique architecture of its houses. The principal edifices are the

feudal castle of Unnot or Münot, on a height commanding the town; the parish or St. John's church; the minster or cathedral, built in 1052–1101, in the Romanesque style, with its ancient bell, made famous by Schiller and Longfellow; the Imthurneum, erected by Herr Imthur, a London banker, containing a theatre, music-schools, and exhibition rooms; library, museum, and the townhouse, built in 1412, and containing some fine wood carving. About 3 miles below the town are the celebrated falls which bear its name, and by which the whole volume of the Rhine is precipitated over a height of more than 70 feet. Pop. 12,360.—The canton is the most northerly in Switzerland, and is situated on the right or German side of the Rhine; area, 116 sq. miles. The surface is very much broken, being traversed throughout by a series of ridges which ramify from the Jura. The only river is the Rhine. The inhabitants

Street in Schaffhausen.

are generally Protestants, and the language spoken is principally German. Pop. 38,348.

Schamyl. See *Shamyl*.

Schandau (shän'dou), a favourite summer resort in Saxon Switzerland, on the right bank of the Elbe, 21 miles S.E. of Dresden. Permanent pop. 3300.

Scharnhorst, GERHARD JOHANN DAVID VON, Prussian general, born 1756, died 1813. He served in the Hanoverian army for a number of years, and then (in 1801) transferred his services to Prussia, where he rapidly rose in army rank, and was ennobled in 1804. After the humiliating Peace of Tilsit (1807—see *Prussia*) he was appointed president of the committee for the reorganization of the army, and it was by his system of short service that Prussia was so well prepared to declare war with France in 1813. In this campaign Scharnhorst accompanied Blücher as lieutenant-general and chief of the staff, and was mortally wounded.

Schaumburg-Lippe (shoum'burh-lip-pē), a principality of the German Empire, in two detached portions; a northern, lying between Hanover, Hesse-Cassel, and Rhenish Prussia, and a southern, between Lippe and Hanover; area, 212 square miles; pop. 37,204. It is drained by a number of small streams, tributaries of the Weser. The soil is fertile, corn is grown for export, and cattle are numerous. Schaumburg-Lippe is a hereditary principality, with a constitution granted in 1868. The diet consists of fifteen members, representing six different estates or orders. Schaumburg-Lippe sends one member to the Bundesrath of the German Empire. The capital is Bückeburg.

Scheele (shā'lē), KARL WILHELM, Swedish chemist, born in 1742; died in 1786. He discovered tartaric acid, chlorine, baryta, oxygen shortly after Priestley, glycerine, and arsenate of copper, called Scheele's-green.

Scheele's-green, a green pigment consisting of a pulverulent arsenate of copper, first prepared by *Scheele* (see above); it is used both in oil and water-colour painting.

Scheffer (shef'ér), ARY, French painter, born at Dort, Holland, in 1795; died at Paris, 1858. He studied in Paris under Guérin, and was early impressed with the Romantic movement. His first picture was exhibited in 1812, and was followed by many genre and historic pictures. Subsequently to about 1827 he turned to the works of Goethe, Byron, Schiller, Dante, &c., and to the Scriptures for the subjects he depicted. He painted a series of pictures from Faust, two Mignons, a Francesca da Rimini, and a Beatrice. Among religious subjects may be mentioned Christus Consolator, Christus Remunerator, Christ bearing His Cross, Christ in the Garden of Olives, Christ Interred, &c. His colouring is defective, though his drawing is correct and his taste refined.

Scheldt (skelt; Dutch, *Schelde*—*shel'dė*; French, *Escaut*—es-kō), one of the most important rivers of Belgium and the Netherlands, rises in the French department of the Aisne; flows circuitously through Belgium; reaches Ghent, where it receives the Lys; at Antwerp attains a breadth of about 1600 feet, and forms a capacious and secure harbour. About 15 miles below Antwerp, shortly after reaching the Dutch frontier, it divides into the East and the West Scheldt, thus forming a double estuary. The whole course is 211 miles.

Schelling (shel'ing), FRIEDRICH WILHELM JOSEPH VON, a German philosopher, born at Leonberg, Würtemberg, in 1775; died 1854. He studied at Tübingen, for a short time also at Leipzig, and from thence proceeded to Jena. His philosophical studies were mainly guided by Fichte, of whom he was first a colleague, and afterwards successor. In 1803 he was appointed professor of philosophy at Würzburg, and in 1806 member of the Academy of Sciences at Munich, of which he subsequently became secretary. He lectured at Erlangen from 1820–26, and in 1827 became a professor at Munich, whence he was called to Berlin in 1841, and lectured for several years in the university of that city on the philosophy of mythology and revelation. Latterly he ceased teaching, and lived sometimes at Berlin, sometimes at Munich, or elsewhere. Schelling's system of philosophy, both in its earlier and later developments, was essentially pantheistic, but its later developments are marked by a strong eclectic tendency, which indicate the dissatisfaction of the speculator with his own results. The principle of identity—or of one absolute and infinite underlying both nature and spirit, real and ideal, objective and subjective—which he retained throughout, formed a link of connection between the most various systems, and afforded the utmost facilities for an eclectic development. He called his later speculation, based on mythology and revelation, positive philosophy, in contradistinction to his speculation on identity, which he called negative philosophy. The object of positive philosophy he defined as being not to prove the existence of God from the idea of God, but from the facts of existence to prove the divinity of the existent. The principal writings of Schelling are: Ideas for a Philosophy of Nature (1797); The Soul of the World (1798); First Sketch of a System of the Philosophy of Nature (1799); System of Transcendental Idealism (1800); Exposition of My System of Philosophy, published in the Journal of Speculative Physics, edited by him (1801–3); Bruno, or the Divine and Natural Principle of Things (1802); Critical Journal of Philosophy (in conjunction with Hegel), 1802–3; Exposition of the True Relation of the Philosophy of Nature to the Amended Theory of Fichte (1806).

Schemnitz (shem'nits), a mining town of Hungary, 65 miles N.W. of Budapest. The mines of Schemnitz were long regarded as among the most important in Europe, including gold, silver, lead, copper, iron, arsenic, and sulphur, but the produce has in recent times greatly fallen off. Pop. 15,265.

Schenec'tady, a city of New York, capital of the county of the same name, on the Mohawk river, about 17 miles from Albany. It is the seat of Union College, incorporated in 1794, and one of the most successful in the States. The Erie Canal and the Delaware and Hudson Canal pass through the city. It has manufactories of locomotives, shawls, &c., besides woollen and flour mills. Pop. 19,902.

Schérer (shā-rer), EDMOND HENRI ADOLPHE, French critic, born in Paris 1815, died 1889. He studied theology and in 1843 became professor of exegesis at Geneva, a post which he resigned in 1850, and henceforward was a leading spirit in the liberal movement in Protestant theology. He was elected to the Assembly in 1871, and four

years after became a senator, but it is as a critic of the literature of the 18th and 19th centuries that he excelled. He contributed largely to the Temps, the London Daily News, &c., and his collected studies have given him the position of literary successor to Saint-Beuve.

Scherer (shā′rĕr), WILHELM, German scholar and historian of literature, born in 1841 at Schönborn, in Lower Austria; died at Berlin in 1886. He studied at Vienna and Berlin, became professor of the German language and literature at Vienna, and then at Strasburg, and in 1877 went to Berlin as professor of modern German literature. His most important work was his History of German Literature (Geschichte der deutschen Litteratur), which has been published in English.

Scherzo (skert′sō), in music, generally applied to a passage of a sportive character in musical pieces of some length—for example, in symphonies, sonatas, &c.

Scheveningen (shā′ven-ing-en), a fishing village and much-frequented watering-place of the Netherlands, in the province of South Holland, 2 miles w. of the Hague. It is situated on sandy dunes, and has a Reformed and a Roman Catholic church, extensive hotel accommodation, &c. There are boat-building yards, &c., but the great staple of the place is the fishing trade. Pop. 17,277.

Schiavone (skyä-vō′nā), ANDREA, a painter of the Venetian school, whose true name was Medola, born at Sebenico, in Dalmatia, 1522; died 1582. He studied under Titian, who employed him in the library of St. Mark, where he is said to have painted three entire ceilings. Two of his compositions are in the church of the Padri Teatini at Rimini, and his Perseus and Andromeda, and the Apostles at the Sepulchre, are in the royal collection at Windsor.

Schiedam (shē′dăm), a town of the Netherlands, in the province of South Holland, near the right bank of the Maas, 4 miles west of Rotterdam. It is intersected by numerous canals, and its chief buildings are an exchange, a town-house, a concert-hall, a public library, and various hospitals. The staple manufacture is gin or Hollands, connected with which there are about 200 distilleries. Pop. 24,165.

Schiller, JOHANN FRIEDRICH CHRISTOPH VON, one of the greatest of German poets, was born at Marbach, Würtemberg, in 1759. His father, originally a surgeon in the army, was afterwards a captain, and finally (1770) superintendent of the woods and gardens attached to a residence—the Solitude—of the Duke of Würtemberg. His first poem is said to have been written the day before his confirmation, in 1772. He had for several years received instruction at a Latin school in order to prepare him for the university; but at this time Charles, duke of Würtemberg, founded a school at the Solitude on a military-monastic plan, and offered to take young Schiller as one of the pupils. His father could not refuse such an offer, and in 1773 Schiller was received into this institution. Here he studied jurisprudence; but when the school was removed to Stuttgart, and its scope became extended (1775), Schiller turned his attention to medicine. When sixteen years old he published a translation of part of Virgil's Æneid in hexameters in a Suabian periodical, and began an epic, the hero of which was Moses. He still continued his medical studies, however, for in 1780 he wrote an Essay on the Connection of the Animal and Intellectual Nature of Man, and in the same year was appointed physician to a regiment in Stuttgart. It was now for the first time that he had enough leisure and freedom to finish his tragedy of Die Räuber (The Robbers), begun three years previously. He published this piece at his own expense in 1781; it excited an immense amount of attention, and in 1782 it was performed at Mannheim. Arrested for attending the performance without leave of the Duke of Würtemberg, and forbidden to write plays by the same despotic authority, Schiller fled from Stuttgart, was naturalized as a subject of the Elector-Palatine, and settled at Mannheim as poet to the theatre (1783). Here the plays of Fiesco and Cabale and Liebe were soon after produced. In 1785 he went to Leipzig and Dresden, where he studied the history of Philip II. In this way he prepared himself not only to write his drama of Don Carlos, which appeared in 1787, but also to publish a History of the Revolt of the Netherlands (1788). Visiting Weimar in 1787 he received a friendly welcome from Wieland, Herder, and Goethe, the latter assisting to procure him (1789) a professorship of philosophy at Jena. Here he lectured on history, and began to publish Historical Memoirs from the Twelfth Century to the Most Recent Times (1790); and his History of the Thirty Years' War appeared in 1790–3. His first periodical, Thalia,

begun in 1784 at Mannheim, having ceased in 1793, he formed the plan of publishing a new periodical, Die Horen (The Horæ or Hours). It was now also that he returned with renewed ardour to poetry, and produced, particularly after 1795, his finest lyrical poems and ballads. From 1799 he lived in intimate acquaintance with Goethe at Weimar, and published in succession his dramas Wallenstein, Maria Stuart, the Maid of Orleans, the Bride of Messina, and William Tell. He also adapted Shakspere's Macbeth, Racine's Phædra, &c., for the stage, with which his dramatic works close. In 1802 he was raised to the rank of nobility. He had long been in weak health, and being attacked by fever he died in 1805. His correspondence with Goethe, William von Humboldt, and C. G. Körner has been published, his life has been written by Carlyle, and of his works there is amongst others an English translation in Bohn's library.

Schilling, JOHANN, German sculptor, born at Mittweida, Saxony, 1828; studied art at Berlin and Dresden. In 1868 he became professor at the Dresden Royal Academy. His chief works include the Four Seasons at Dresden, Schiller's statue at Vienna, Maximilian's statue at Triest, War Memorial at Hamburg, and the German National Monument on the Niederwald, opposite Bingen on the Rhine, with a colossal figure of Germania.

Schinkel, KARL FRIEDRICH, German architect, born at Neu Ruppin, Brandenburg, 1781; died 1841. He was educated at Berlin; entered into practice as architect; went to Italy to enlarge his knowledge; and on his return, finding no field for his art he turned to landscape-painting. In no long time, however, he again devoted himself to architecture, and latterly became chief director of the public buildings in Berlin. He was architect of the Berlin museum, the Berlin theatre, and other prominent buildings, mostly in the Greek style. A collection of his architectural designs was published in twenty-six parts, Berlin, 1820–37; and his Werke der höhern Baukunst, Potsdam, 1845–46.

Schist (shist), a geological term applied to rocks which have a foliated structure and split in thin irregular plates, not by regular cleavage, as in the case of clay-slate, nor in laminæ, as flagstones. It is properly confined to metamorphic or crystalline rocks consisting of layers of different minerals, as gneiss, mica-schist, hornblende-schist, chlorite-schist, &c.

Schizop'oda, a tribe of long-tailed decapod crustaceans. They are all of small size and marine. The Mysis, or opossum-shrimp (which see), furnishes an example of these creatures.

Schlangenbad (shlång'en-bât), a watering-place of Prussia, in Hesse-Nassau, 6 miles W.N.W. of Wiesbaden, among wooded hills. It consists chiefly of lodging-houses, and two large bathing establishments. The water has a temperature of from 80° to 88°, and is beneficial in hysteria, neuralgia, rheumatism, gout, paralysis, &c.

Schlegel (shlā'gèl), AUGUST WILHELM VON, a distinguished German scholar, born at Hanover 1767, died at Bonn 1845. At an early age he showed an aptitude for languages and poetry; studied theology and philology at Göttingen; became a tutor in Amsterdam; contributed to Schiller's periodicals; was appointed professor first at Jena and then in Berlin; engaged in a bitter controversy with Kotzebue; travelled through France, Germany, and Italy with Madame de Staël; and in 1813 acted as secretary to the Crown-prince of Sweden. Five years later he was made a professor in the University of Bonn. He wrote various poems and ballads, delivered lectures on literature and art, published a tragedy called Ion, translated the most of Shakspere's and Calderon's plays into German, and devoted the latter part of his life to oriental studies and the translation of various works from Sanskrit.

Schlegel, KARL WILHELM FRIEDRICH VON, brother of the foregoing, born 1772, died 1829. He studied philology at Göttingen and Leipzig, and became an accomplished scholar. He early contributed to various periodicals; published Greeks and Romans, and in 1798 wrote Lucinde, an unfinished romance, and Alarcos, a tragedy; and lectured as a privat-docent in the University of Jena. In 1803 he joined the Roman Church; was appointed an imperial secretary at Vienna in 1808; and was councillor of legation for Austria in the Frankfort diet. Besides the lectures which he published his chief works are: History of the Old and New Literature (1815); Philosophy of Life (1828); Philosophy of History (1829); and the Philosophy of Language (1830). His wife, a daughter of Moses Mendelssohn, was the author of some works published under Schlegel's name.

Schleicher (shlī'*h*ėr), AUGUST, German philologist, born 1821, died 1868. He was educated at the Gymnasium of Coburg, at Leipzig, Tübingen, and Bonn. In 1850 he was appointed professor of comparative philology at Prague, and in 1857 became honorary professor of the science of language and Old German philology in the University of Jena. His published works embrace Zur vergleichenden Sprachengeschichte (Bonn, 1848); Die Sprachen Europas (1850); Die Formenlehre der kirchenslawonischen Sprache (1853); Handbuch der litauischen Sprache (two vols. 1857); and the well-known Compendium der vergleichenden Grammatik der indo-germanischen Sprachen (Comparative Grammar of the Indo-European Tongues; 1862).

Schleiermacher (shlī'ėr-mȧ*h*-ėr), FRIEDRICH ERNST DANIEL, German Protestant theologian and philosopher, born at Breslau 1768, died at Berlin 1834. He studied at the University of Halle; was ordained and appointed assistant preacher at Landsberg; and afterwards became minister in the Charité-Haus (a great hospital) at Berlin. In 1802 he removed to Stolpe, and two years afterwards was appointed extraordinary professor of theology at Halle, and preached to the university. In 1807 he went to Berlin as pastor of Trinity church there, and in 1810, when the new university was opened in that city, he was appointed ordinary professor. In 1817 he became a member of the Academy of Sciences, and in the same year he was president of a synod assembled at Berlin for the promotion of union between the Lutheran and Reformed Churches. He continued to preach in public, and his discourses had a great influence. The works of Schleiermacher, besides numerous sermons, include: Outlines of a Critique of Ethics as heretofore taught; Translation of Plato's Works; Christian Belief according to the Fundamental Doctrines of the Evangelical Church; Sketch of a System of Morals; Philosophical Ethics; Dialectics; Æsthetics; &c.

Schlesien (shlā'zi-en), the German form of *Silesia*.

Schlestadt. See *Schlettstadt*.

Schleswig (shles'vi*h*; Danish, *Slesvig*), a seaport, capital of the Prussian province of Schleswig-Holstein, at the head of the Schlei, a long narrow inlet of the Baltic. The most noteworthy edifices are the cathedral, of the 15th century, a fine Gothic pile, with a fine oak altar-screen, and the old ducal castle of Gottorf, now a barrack. The industries include leather goods, machinery, ship-building, fishing, &c. The town was an important trading centre in 808, and became a bishopric in 948. Pop. 15,187.

Schleswig-Holstein, since 1866 a province of Prussia, bounded on the north by Denmark; east by the Baltic, Lübeck, and Mecklenburg; south by Mecklenburg and the territory of Hamburg; south-west by the Elbe; and west by the North Sea; area, 7273 square miles. Schleswig is the portion lying north of the Eider; Holstein that south of this river. Schleswig-Holstein forms part of the same peninsula with Jutland, to which in its general character it bears considerable resemblance. There are extensive moorlands; the west coast consists of sandy and marshy flats, protected in Schleswig by chains of islands, in Holstein by lofty dykes; the east coast is scooped out into natural harbours; the principal streams flow to the west, towards which for the most part the country slopes. Lakes are numerous. Schleswig is separated from Holstein by the river Eider and the Schleswig-Holstein Canal. The Eider is the principal river. The country is fertile, and is chiefly agricultural. The great majority of the inhabitants are of German origin. The principal towns are Altona, Kiel, Flensburg, and Schleswig, the capital. Schleswig-Holstein, which became a united duchy in 1386, passed over to Denmark in 1773, and was appropriated by Prussia after the war of 1866. (See *Denmark* and *Prussia.*) Pop. 1,150,306.

Schlettstadt (shlet'stȧt), a town of Germany, in the province of Alsace-Lorraine, on the left bank of the Ill, 26 miles south-west of Strasburg, on the railway to Basel. It was formerly fortified by Vauban, and contains two fine churches of the 11th and 14th centuries, and a fine Gothic gateway. The fortifications have been removed since the Germans have held the town. Pop. 9172.

Schliemann (shlē'mȧn), HEINRICH, German archæologist, born in 1822. Having obtained a place as correspondent and bookkeeper to an Amsterdam firm, and having been sent by them to St. Petersburg, he established himself there in business on his own account. He travelled widely and acquired many languages, and having made a fortune commenced a series of archæological investigations in the East. In 1869 he published at Paris his Ithaque, Le Péloponnese, Troie: Recherches Archæolo-

giques, an account of his travels in these regions, and this was followed in 1874 by his Trojanische Alterthümer, giving the results of his researches and excavations on the plateau of Hissarlik, the alleged site of ancient Troy. In 1875 he commenced excavations at Athens and Mycenæ, and in 1877 discovered the five royal tombs which local tradition in the time of Pausanias asserted to be those of Agamemnon and his companions. Many treasures of gold and silver were brought to light. His Mycenæ, a narrative of researches and discoveries of Mycenæ and Tiryns, was published in 1877, with a preface by Gladstone. He received valuable assistance in his investigations from his wife, who is a native of Greece and an accomplished scholar. His Troja (1883) and his Tiryns (1886) are in a measure supplementary to his earlier works on Troy and Mycenæ. He died in 1890.

Schlosser (shlos'ér), FRIEDRICH CHRISTOPH, a German historian, born 1775. He was educated at Göttingen, in 1812 was appointed professor in the newly-founded Lyceum of Frankfort, and when it ceased to exist in 1814 he became city librarian. In 1817 he was called as professor of history to Heidelberg. His first great historical work, the History of the World in a connected narrative (1817–24), was followed in 1823 by his History of the Eighteenth Century, which in its subsequently enlarged form won him yet wider fame. His other works include a View of the History of the Old World and its Civilization (1824–34), and a History of the World for the German People (1844–53). Along with Bercht he edited the collection of Archives for History and Literature (1830–35). He died at Heidelberg in 1861.

Schlözer (schleu'tsér), AUGUST LUDWIG VON, German historian, born in 1737. After studying at Wittenberg and Göttingen he went as tutor to Sweden, and lived at Stockholm and at Upsala. In 1759 he returned to Göttingen and commenced the study of medicine. In 1761 he proceeded to St. Petersburg as tutor to the Russian historian Müller, and engaged diligently in the study of the Russian language and history. In 1765 he was appointed a professor in the Academy, but subsequently returned to Germany, having been appointed to the chair of political science at Göttingen, a post held by him till his death in 1809. The fruit of his residence and studies in Sweden and Russia was his Allgemeine Nordische Geschichte (1772) and a translation and exposition of Nestor's Russian Annals (1802). At a later period appeared his Weltgeschichte or History of the World (1792–1801).

Schmalkalden (shmâl'kâl-dèn), a town of Prussia, prov. Hesse-Nassau, on the Schmalkalde, 30 miles S. of Eisenach. It is an antique and picturesque town with double wall and ditch, narrow streets, two castles, and a handsome Gothic church (15th century). The staple manufactures are iron and steel wares, and there are extensive mines and saltworks in the vicinity. Pop. 6729.

Schmalkalden, LEAGUE OF, the league formed at the close of 1530 by the Protestant princes of Germany, assembled at Schmalkalden, to resist the aggressive measures contemplated by the Emperor Charles V. It ultimately included seven princes, two counts, and twenty-four cities, representing the whole of Northern Germany, Saxony, Würtemberg, and Denmark, with portions of Bavaria and Switzerland. The object of the league was the common defence of the political and religious freedom of the Protestants, and the confederacy was first intended to continue only for six years, but subsequent events induced them in 1535 to renew it for another period of ten years, and to raise a permanent army to carry out the objects of the league. About this time it was joined, among others, by the king of France, Francis I., though only from political motives, and Henry VIII. of England declared himself its protector. The confederacy received a fuller consolidation by a new Protestant confession, drawn up at the instance of John Frederick of Saxony by Luther and other divines, and known as the Articles of Schmalkalden, from the circumstance of their having been signed (1537), like the league itself, at the town of Schmalkalden. These articles were essentially the same as those of the Confession of Augsburg. The league was latterly crippled by mutual jealousy and the conflict of interests, and its early successes in the so-called Schmalkaldic war were ultimately more than outweighed by the complete rout at Mühlberg and the capture of John Frederick. The ends of the league, however, were ultimately gained through the instrumentality of Duke Maurice, now elector of Saxony, who in 1552 declared war against the emperor, and forced him in 1552 to grant the Treaty of Passau, which secured the religious liberty of the Protestants.

Schmitz (shmits), LEONARD, Ph.D., LL.D., born at Eupen, near Aix-la-Chapelle, in 1807; educated at Bonn under Niebuhr and Welcker. He settled in England in 1836, and was rector of the high school at Edinburgh from 1845 to 1866, principal of the London International College 1866–74, and subsequently classical examiner in the University of London. He was classical tutor to the Prince of Wales (1859) and to Prince Alfred (1862–63). He wrote school grammars and histories, translated into English Niebuhr's Lectures and Zumpt's Latin Grammar, and edited the Classical Museum (1844–50). He died in 1890.

Schnapps, a name sometimes given to Hollands gin or other ardent spirits.

Schneeberg (shnā'berh), a town in Saxony, on the Mulde, 29 miles S.S.W. of Chemnitz. It contains a parish church, a fine Gothic building; and has manufactures of lace and embroidery, dolls, &c. There are mines of silver, tin, iron, and cobalt. Pop. 7949.

Schneekoppe (shnā'kop-pĕ), or RIESENKOPPE (rē'zen-), a mountain of Germany, the culminating point of the Riesengebirge (which see).

Schneiderian Membrane, the lining membrane of the nostrils; the pituary membrane, so named from Schneider, who first described it.

Schnorr von Karolsfeld, JULIUS, German painter, born at Leipzig 1794. His father was also a painter of some note. From 1817 to 1827 he resided in Italy, and was then invited by Ludwig, king of Bavaria, to Munich, where he became professor of historical painting in the Academy of Fine Arts. His frescoes in illustration of the Niebelungenlied, and of the lives of Charlemagne, Frederick Barbarosa, and Rudolf of Hapsburg, at Munich, are amongst the most famous of modern works of this class. In 1846 he accepted an invitation to become director of the picture-gallery and professor at the Academy of Fine Arts in Dresden. While here he completed his Illustrations of the Bible, which were engraved and published under the title of Die Bibel in Bildern (240 plates, large 4to, Leipzig, 1852–60). These have been published in Great Britain, with descriptive English text. They exhibit wonderful animation, variety, and power, and are accounted the finest extensive series of illustrations of the Bible that have ever been produced by one artist. To the Dresden period also belong the oil-painting of Luther at the Diet of Worms, and the designs for a window for St. Paul's, London. This window, representing the conversion and cure of St. Paul, was inserted in its place in 1867. Schnorr died in 1872.

Schœnus (skē'nus), a genus of bog plants, natural order Cyperaceæ. The black bog-rush (*Schœnus nigricans*) is the only European species.

Schöffer (sheuf'ĕr), PETER, an early printer, born at Gernsheim, near Darmstadt, between 1420 and 1430; educated at the University of Paris, where he was a copyist in 1449; removed to Mainz in 1450, and married the daughter of Johann Fust. He is credited with having perfected the art of printing by devising an easier mode of casting type. Died 1502. See *Printing*.

Scholarship, in universities, a certain class of foundations in colleges for the maintenance of students. In Oxford and Cambridge the scholarship is superior to an exhibition, but inferior to a fellowship. The value of scholarships in the English universities varies from £20 to £100. In Scotland there are comparatively few scholarships, but they are generally superior in money value to the English ones, the latter corresponding more to the Scotch bursaries.

Scholas'ticism, the name given to the system of philosophy taught by the philosophers of the middle ages, who were called *scholastics* or *schoolmen* from the circumstance that their philosophy originated in the schools instituted by and after Charlemagne for the education of the clergy. The philosophy here taught consisted in a collection of logical rules and metaphysical notions drawn from the Latin commentators on Aristotle, and from the introduction of Porphyry to the writings of Aristotle. The character of the scholastic philosophy, however, varied considerably at different periods. Historians are not agreed as to the exact period of its origin. Those who regard particularly its theological character make Augustine its founder; others consider it as having commenced in the Monophysite disputes of the 5th and 6th centuries. The great aim of the schoolmen was to reduce the doctrines of the church to a scientific system. They started with the assumption that the creed of the church was absolutely true; the criterion of truth and falsehood in matters common to philosophy and theology was not sought in observation and in thought itself, but in the dogmas of the church. The first period of the schoolmen may be considered as extending from the 9th to the 13th

century, and is characterized by the accommodation of the Aristotelian logic, and of Neo-Platonic philosophemes to the doctrines of the church. The period begins with John Scotus Erigena, and numbers, amongst other names, those of Berengarius of Tours and his opponent Lanfranc, Anselm, archbishop of Canterbury, Roscellinus, Abelard, Peter Lombardus, and John of Salisbury. The period is marked by the controversies that raged between the Nominalists and the Realists, and which terminated at length in the triumph of the latter. The second period of scholasticism, extending from the 13th to the 15th century—from Alexander of Hales to the close of the middle ages, when classical studies were revived and the sciences of nature and human nature began once more to be studied, presents us with the complete development of scholasticism, and also with its dissolution. During this period the Aristotelic philosophy exercised a more marked influence; Realism was also triumphant, until, towards the end of the period, William of Occam rose up as the champion of Nominalism, and in distinguishing thought from being, and the theoretical from the practical, gave to philosophy a wider range and a freer spirit. The zenith of scholasticism is constituted by Thomas Aquinas, a Dominican (died 1274), and Duns Scotus, a Franciscan (died 1308), who were the founders of the two schools into which the entire movement was thenceforward divided. With the separation of theory and practice, and still more with the separation in Nominalism of thought and thing, philosophy was disjoined from theology, and reason from faith. The result of this was that religious minds turned away from a theology which had become a mere formal logical system to take refuge in mystic experiences of the inner life; while others, renouncing theology altogether, sought an outlet for their mental energies in the study of nature and mind. The former of these tendencies culminated in the Reformation, and the latter in modern philosophy.

Scholia, explanations annexed to Greek or Latin authors by the Greek and Latin grammarians (*scholiasts*). There are many scholia to Greek authors extant, fewer to Latin. The names of the scholiasts are mostly unknown. Those, however, of Didymus, John Tzetzes, and Eustathius, the famous scholiast of Homer, have been preserved. The two last belong to the 12th century.

Schomberg (shom'berg), FREDERICK HERMANN, DUKE OF, a distinguished soldier, a native of Germany, born about 1619, the son of Count Schomberg by the daughter of Lord Dudley. He began his military career under Frederick, prince of Orange, and afterwards went to France. He was then employed in Portugal, and was successful in establishing the independence of that kingdom. He commanded the French army in Catalonia in 1672, and was afterwards employed in the Netherlands, where he obliged the Prince of Orange to raise the siege of Maestricht. For these services he was created a marshal of France in 1675; but on the revocation of the Edict of Nantes Marshal Schomberg, who was a Protestant, quitted the French service, and took service under the Elector of Brandenburg. He went to England in 1688 with William III., and after the Revolution was created a duke. He was sent to Ireland in the following year to oppose the partisans of James II., and took Carrickfergus, but was killed at the battle of the Boyne in 1690.

Schomburgk (shom'burk), SIR ROBERT HERMANN, traveller, son of a German Protestant clergyman, was born in 1804. He engaged in commercial pursuits, went to North America, then to the West Indies (1830), and gained the patronage of the Royal Geographical Society of London by a report on the island of Anegada in the West Indies. From 1835 to 1839 he was engaged in the exploration of Guiana, a commission undertaken at the instance of the Royal Geographical Society of London. It was in the course of these explorations that he discovered (1837) the gigantic waterlily, *Victoria regia*. Returning to England in 1839, he received the gold medal of the Royal Geographical Society for a work entitled Travels and Researches during the years 1835–39 in the Colony of British Guiana, &c. In 1840 he was sent to make a survey of British Guiana for the government, and in 1844 received the honour of knighthood for his services. From 1848 to 1853 he acted as British representative to the Republic of Santo Domingo, and in 1857 was appointed to a similar post at Bangkok in Siam. He died at Berlin in February 1865. In addition to the works already alluded to he wrote a Description of British Guiana (1840) and a History of Barbadoes (1847), and other works.

Schönbrunn (shœn'brun), a royal palace in the environs of Vienna. See *Vienna*.

Schönebeck (*shæu'*né-bek), a town in the government of Magdeburg, Prussia, on the left bank of the Elbe, 9 miles S.S.E. of Magdeburg. It is a very ancient place; and an important salt-mining centre. Pop. 13,319.

Schöningen (*shæu'*ning-en), a town of Germany, in Brunswick, 20 miles S.E. of Brunswick, with a salt-work, chemical works, &c. Pop. 6921.

Schoolcraft, HENRY ROWE, an American ethnologist and geologist, born at Watervliet (now Guilderland), in Albany county, New York, 1793. He was educated at Union and Middlebury Colleges, and in 1816 commenced an unfinished serial work on glass-making, entitled Vitreology. In 1817–18 he made a journey to the west, with the object of extending his knowledge of geology and mineralogy, and on his return published A View of the Lead Mines of Missouri, &c. In 1820 he was appointed geologist to the expedition despatched by the government to explore the sources of the Mississippi, and in 1821 was appointed secretary to an Indian conference at Chicago. In 1822 he was appointed agent for Indian affairs in the north-western provinces, and having married a lady of Indian descent, devoted himself to the investigation of the languages, ethnology, and antiquities of the Indians. From 1828 to 1832 he was a member of the territorial legislature of Michigan. In 1832 he conducted a government expedition to the Upper Mississippi, in the course of which he explored the sources of that river. In 1836 he negotiated the purchase for government of 16,000,000 acres in this region, and after this he was appointed acting superintendent of Indian affairs for the northern department. In 1847 he was appointed by the government to prepare an extensive work on the Indians, which appeared under the title of Historical and Statistical Information respecting the History, Condition, and Prospects of the Indian tribes of the United States (1851–57). Besides the works already mentioned we have from his prolific pen Algic Researches; comprising inquiries respecting the Mental Characteristics of the North American Indians; Thirty Years with the Indian Tribes of the North-Western Frontier; The Indian in his Wigwam; and the Myth of Hiawatha and other Legends; besides poems, lectures, reports, &c. For his Lectures on the Indian Languages he received the gold medal of the French Institute. Schoolcraft married a second time in 1847. He died at Washington in 1864.

Schoolmen. See *Scholasticism.*

Schools. See *Education, Gymnasium, Normal Schools, Real Schools*, &c., also articles on the various countries.

Schooner, a small fast-sailing sharp-built vessel with two masts, and the principal sails of the fore-and-aft type. There are two chief kinds of schooners, the top-sail schooner and the fore-and-aft schooner, the former

Topsail Schooner.

carrying a square top-sail and top-gallant sail (with sometimes a royal) on the fore-mast, and the latter having fore-and-aft sails on both masts, with sometimes a square sail on the fore-mast. The first schooner is said to have been launched at Gloucester, Massachusetts in 1713. A three-masted schooner carries fore-and-aft sails on each mast.

Schopenhauer (*shō'*pen-hou-ėr), ARTHUR, a German philosopher, born at Danzig 1788. His father was a banker, and his mother, Johanna Schopenhauer, attained considerable distinction in the literary world as a writer of books of travel and novels. In his youth he travelled in France and England, and acquired an extensive knowledge of the language and literature of both these countries. In 1809 he entered the University of Göttingen, where he studied philosophy, and afterwards went to Berlin and Jena. He graduated at Jena in 1813 with an essay on the Fourfold Root of the Principle of Sufficient Reason (Uber die vierfache Wurzel des Satzes vom zureichenden Grunde), in which he lays down the basis of his future system. From 1814 to 1818 he lived at Dresden, and occupied himself principally with the preparation of his most important work—The World as Will and Idea (Die Welt als Wille und Vorstellung, 1819). Previous to this he had published a work on optics (Ueber das Sehen und die Farben,

1816). In 1818 he visited Rome and Naples, and from 1822 to 1825 was again in Italy, returning in the latter year to Berlin. Here as a private lecturer he met with little success, and on the outbreak of cholera in 1831 he left the capital and spent the remainder of his life in private at Frankfort-on-the-Main, devoting himself to the elaboration of his system. He died in 1860. His later works are Die beiden Grundprobleme der Ethik (The Two Fundamental Problems of Ethics; Frankfort, 1841) and Parerga und Paralipomena (Berlin, 1851). The philosophical system of Schopenhauer has for its fundamental doctrine the proposition that the only essential reality in the universe is *will*, in which he includes not only conscious desire, but also unconscious instinct, and the forces which manifest themselves in inorganic nature. What are called appearances exist only in our subjective representations, and are merely forms under which one universal will manifests itself. Between this universal will and the individuals in which it appears there are a number of ideas, which are stages in the objectivication of the will. Throughout nature, from the lower animals downwards, the will works unconsciously, and it only attains consciousness in the higher stages of being, as man. All intelligence serves originally the will to live. In genius it is emancipated from this servile position, and gains the preponderance. Upon this foundation Schopenhauer rears his æsthetical and ethical structures; the former of which derives much from the Platonic system, while the latter resembles in maintaining the necessity of entirely subduing the sensuous nature in man, without determining positively the true end of spiritual life, the Buddhistic doctrine of Nirvana. The final teaching of Schopenhauer is, therefore, that of a philosophic pessimism, having as its ideal the negation of the will to live.

Schorel, or SCOREL, JAN VAN, a Dutch painter, who received his name from Schoorl, a village near Alkmaar, where he was born in 1495. He studied under William Cornelis, Jakob Cornelis, and Mabuse, came under the influence of Dürer at Nuremberg, and afterwards visited Venice, Jerusalem, and Rhodes, and resided several years in Rome, returning in 1525. He died at Utrecht in 1562. Italian influence is specially discernible in his works.

Schorl. See *Tourmaline.*

Schottische (shot-tish'), a dance performed by a lady and gentleman, somewhat resembling a polka; it is in $\frac{2}{4}$ time.

Schubert (shö'bert), FRANZ, one of the greatest composers of modern times, born at Vienna in 1797, the son of a teacher; commenced his musical education in his seventh year, and in 1808 was admitted among the choristers of the court chapel. He soon acquired particular efficiency on the piano and the different stringed instruments, so that in a short time he was able to take the part of first violin in the orchestra. After he left the court chapel he supported himself by teaching music, devoting himself in obscurity and neglect to original composition. He achieved success in almost all kinds of music, but his genius was specially noteworthy for its opulence in melody and lyric power. His songs and ballads, as exemplified in his three principal collections, the Winterreise (1826–27), the Müllerlieder (1828), and the Schwanengesang (1828), may be said to have revolutionized the *Lied* in making the accompaniment not less interpretative of the emotions of the poem than the vocal part, and in breaking through the limitations of the old strophic method. Besides his six hundred songs he left about four hundred other compositions, including fifteen operas, six masses, and several symphonies. Two only of the operas, Rosamond and the Enchanted Harp, were performed during his life, and they are considered inferior to his unproduced Fierabras. His symphonies take a higher rank, the Seventh (in C major) being ranked by Mendelssohn and Schumann with Beethoven's. His entire work justifies Liszt's description of him as the most poetic of musicians. He died in Vienna in 1828.

Schumann (shö'mán), ROBERT, musical composer and critic, born at Zwickau in the Kingdom of Saxony in 1810. He studied law at Leipzig, but in 1830 finally devoted himself to music under the tuition of Friedrich Wieck and Heinrich Dorn. The daughter of the former, the celebrated pianiste Clara Wieck (born 1819), became his wife in 1840. In 1834 he commenced his Neue Zeitschrift für Musik, a journal which was to herald an ideal music, and which, for the ten years of his more intimate connection with it, exercised an important influence upon the development of the art, not incomparable with that of Lessing's Hamburg Dramaturgy in drama. Prior to 1840 his principal works were the Fantasias, the Scenes of Childhood, the Etudes Symphoniques, the Kreisleriana, the

Abegg variations, the Papillons, the Carnival, and two sonatas in F sharp minor and G minor. In the year following his marriage he published nearly one hundred and fifty songs, many upon Heine's words, and all marking an advance upon previous composers in the fidelity and subtlety with which they reproduced the most delicate shades of meaning in the poems selected for musical treatment. He then commenced his great series of orchestral works, his symphony in B flat being first performed at the close of 1841. It was followed by his Overture Scherzo and Finale, his D minor symphony, three quartets, the piano quintet and quartet, the cantata Paradise and the Peri, the C major symphony (1846), Genevieve (1847), Manfred (1848), the Faust music (1850), the E flat symphony (1851), and other works. Under stress of work, however, his reason failed him, and after an attempt to drown himself in 1854 he was confined in a lunatic asylum, where he died in 1856. In the line of musical descent Schumann stands between Beethoven and Wagner.

Schumla. See *Shumla*.

Schuylkill (skōl'kil), a river of the U. States, in Pennsylvania, which rises in the north side of the Blue Mountains, runs south-east, passes through the confines of Philadelphia, and unites with the Delaware 7 miles below that city. It is 140 miles long, and navigable for boats of 300 or 400 tons to Philadelphia.

Schwab (shvâp), GUSTAV, a German poet, born at Stuttgart in 1792, educated there and at Tübingen, a friend of Uhland, Fouqué, Chamisso, &c., professor of ancient literature in the upper gymnasium at Stuttgart in 1817, and afterwards pastor successively of Somaringen and St. Leonhardskirche in Stuttgart. His earlier poems were collected from various periodicals and almanacs in 1828–29, and passed through several editions. He excelled more particularly in ballads and songs, but was the author of various works in prose, including a Life of Schiller (1840), and editor of numerous others. He died in 1850.

Schwabach (shvâ'ba*h*), a town of Bavaria, in Middle Franconia, on a stream of the same name, 10 miles south-west of Nürnberg. It has a fine Protestant church (1469–95) with paintings and carvings, and carries on extensive manufactures of needles. Pop. 7670.

Schwabach, ARTICLES OF, a confession of faith drawn up by Luther for the princes and cities assembled in 1529 at Schwabach. The cities of South Germany, inclining to the Swiss doctrine, refused to subscribe, and these articles, adopted by the Schmalkaldic League, became thus a chief obstacle to a union between the party of Luther and Zuinglius.

Schwäbisch-hall (shvā'bish-hâl), or HALL, a town of Wurtemberg, in the circle of Jaxt, beautifully situated in the deep valley of the Kocher, 35 miles north-east of Stuttgart. It is a picturesque old town, and has extensive salt-works and salt-baths. From the 13th century till 1802 Hall was a free imperial city. Pop. 9126.

Schwanthaler (shvân'tä-lêr), LUDWIG MICHAEL, a German sculptor, born at Munich in 1802, where his father, the court sculptor, died in 1821. On the death of his father he succeeded him, and executed various commissions for King Maximilian, and a great number for his successor King Ludwig. After a short residence in Rome in 1826 he returned to Munich and executed important sculptures for the Glyptothek, a statue of Shakespeare for the theatre royal, &c. In 1832 he again visited Rome, remaining there two years. In 1835 he was made professor in the Academy of Arts in Munich. Among his more important works may be specified fifteen colossal statues for the principal pediment of the Walhalla, on the Danube, near Ratisbon; the fifteen figures of the Battle of Arminius for the northern pediment of the Walhalla; the great bass-relief frieze, more than 250 feet long, in the Barbarossa Hall of the royal palace, Munich; the pediment group for the Art Exhibition buildings, Munich; the colossal bronze statue of Bavaria, 70 feet high, in front of the Ruhmeshalle (Hall of Fame), Munich; a marble statue of the Emperor Rudolf for the cathedral in Spires; a statue of Mozart for Salzburg; a marble group of Ceres and Proserpine for Berlin; and numerous designs for sculptors and painters. He died in 1848. Schwanthaler was the chief representative of the 'romantic' school in sculpture, and his works are often deficient in truth to nature and reality.

Schwarz (shvârts), BERTHOLD, born in the first half of the 14th century, a Franciscan friar of Germany, formerly regarded as the inventor of gunpowder and firearms. The invention of gunpowder, however, is probably at least as old as the time of Roger Bacon (d. 1292), but Schwarz may perhaps be credited with the invention of field artillery.

In 1380 he was commissioned by the Venetian government to cast some cannons. The price agreed upon not being forthcoming he became importunate, and was thrown into prison, where it is believed he died in 1384.

Schwarz, CHRISTIAN FRIEDRICH, Protestant missionary, born in 1726 at Sonnenburg, in Brandenburg, educated in his native town and at Küstrin till 1747, when he proceeded to the University of Halle. In 1750 he sailed from London for Tranquebar, the seat of a Danish mission, where he laboured till 1766, when his services were accepted by the Society for Promoting Christian Knowledge. He then removed to Trichinopoly, and afterwards to Tanjore. His influence in India was shown by the fact that Hyder Ali admitted him as an ambassador for the negotiation of peace after refusing all other envoys, and that his personal guarantee of payment was sufficient to procure the relief of Tanjore from imminent famine. He died in 1798.

Schwarzburg-Rudolstadt (shvärts'burh-rö-dol-stät), a German principality, consisting of several isolated portions, situated between Prussian Saxony, the Saxon duchies, and the principality of Reuss. It lies on the northern side of the Thuringian Forest, and has an area of 362 square miles. The surface is rugged, and the soil by no means fertile. The most important crop is flax, the culture of which is almost universal. A great part of the land is devoted to pasture, and great numbers of cattle are reared. The minerals include brown coal, iron, slate, and salt. The principal manufactures are glass and porcelain. The inhabitants are almost all Lutherans. The capital is Rudolstadt. Pop. 83,836.

Schwarzburg-Sondershausen, a German principality on the northern side of the Thuringian Forest, between the territories of Prussian Saxony and the Saxon duchies, and consisting of several distinct portions; area, 332 sq. miles. It is more fertile than Schwarzburg-Rudolstadt, producing corn for export. One of the principal sources of revenue is derived from the forests, which furnish excellent timber. Flax also is extensively cultivated, and great numbers of cattle, sheep, and swine are reared. The only manufacture of any importance is porcelain. The inhabitants are almost all Lutherans. The capital is Sondershausen. Pop. 73,606.

Schwarzenberg (shvärts'en-berh), ADAM, COUNT OF, born in 1587. He was prime-minister to the Elector of Brandenburg, and all-powerful during the Thirty Years' war, causing great calamities to the electorate of Brandenburg by promoting an alliance with Austria against the Swedish Protestant League. When the 'great elector' assumed the reins of government he imprisoned Schwarzenberg in the fortress of Spandau, where he died of apoplexy in 1641.

Schwarzenberg, FELIX LUDWIG JOHANN FRIEDRICH, PRINCE OF, an Austrian statesman, born 1800, entered in 1818, as cadet, a regiment of hussars, and advanced to be captain; in 1824 went to St. Petersburg as an attaché to the embassy, and was subsequently employed in connection with the embassies at London, Brazil, Paris, Berlin, Turin, Parma, and Naples. Returning to Vienna from Naples in 1848 he re-entered the army, but soon after, on the suppression of the popular rising in Vienna, he was called to be the head of the new government. His great object was to govern Austria as a single state in a military and absolute manner—still not without some inclination to internal reforms; and to establish the preponderance of the Austrian power in Germany and Central Europe; and this, after the suppression of the Hungarian revolt, he largely succeeded in doing. He died in 1852.

Schwarzenberg, KARL PHILIPP, PRINCE OF, Austrian field-marshal, born at Vienna in 1771, served in the early wars of the French revolution, taking part in the battles of Würzburg, Ulm, Austerlitz, and Wagram. He negotiated the marriage between Napoleon and Maria Louisa. In the campaign of 1812 he commanded the Austrian auxiliary corps in Galicia, and at the close of the year received the staff of field-marshal-general. After Napoleon's return from Elba he commanded the allied forces on the Upper Rhine, and though the contest was decided at Waterloo without his participation, he took part in the subsequent movement upon Paris. The prince died in 1820.

Schwarzwald. See *Black Forest.*

Schwedt (shvet), a town in Prussia, on the left bank of the Oder, 24 miles south-west of Stettin. The principal edifice is the old castle, in which a branch of the margraves of Brandenburg resided. Its manufactures are chiefly tobacco and cigars. Pop. 9756.

Schwegler (shvāg'lĕr), ALBERT, a German philosophical writer and theologian, born in 1819. He was educated at Tübingen (1836–40), where he became a privat-docent, and subsequently extra-professor of classical

literature, being latterly appointed ordinary professor of history. He died in 1857. His Geschichte der Philosophie (History of Philosophy) is widely known outside Germany through the translations of Professor Seelye of Amherst and Dr. Hutcheson Stirling. His other chief works were Das Nachapostolische Zeitalter (The Post-Apostolic Age; 1846), Geschichte der Griechischen Philosophie (History of Greek Philosophy; 1859), and editions of the Clementine Homilies, Aristotle's Metaphysics, &c.

Schweidnitz (shvit'nits), a town of Prussia, in Silesia, on a height above the Weistritz, 29 miles south-west of Breslau. Its manufactures include machinery, woollens, linens, furniture, earthenware, carriages, gloves, beer, and spirits. It was made a regular fortress by Frederick the Great, and figured much during his wars. During its last siege, in 1807, it was taken in thirty-six days by the French, and its outworks were dismantled. Its fortifications were removed in 1864. Pop. 23,669.

Schweinfurt (shvīn'fŭrt), a town of Bavaria, on the Main, which is spanned by two bridges, 24 miles N.N.E. of Würzburg. It is partly surrounded by old walls, and was long a free imperial city. It has a handsome town-house of 1570, and a gymnasium founded by Gustavus Adolphus. The manufactures include Schweinfurt green, white-lead, and other colours. Pop. 12,502.

Schweinfurt Green. See *Emerald Green.*

Schwerin (shvā-rēn'), the capital of Mecklenburg-Schwerin, on the western shore of the lake of same name and other smaller lakes, 60 miles east of Hamburg. It is pleasantly situated, has a fine old Gothic cathedral (13th to 15th centuries), a grand-ducal palace on an island, grand-ducal museum and picture-gallery, and an arsenal. The manufactures consist of machinery, carriages, woollen and linen cloth, lacquer and earthen ware, &c. Pop. 31,528.

Schwyz (shvēts), a central canton of Switzerland, bounded on the north by the Lake of Zürich and canton St. Gall, west by Zug and Luzern, south by Lake Luzern, and east by Glarus; area, 353 square miles. It belongs to the so-called mountain cantons, being traversed in all directions by lofty hills, including the Mythen, the Rigi, the Rossberg, the Drusberg, &c. The whole canton belongs to the basin of the Rhine, more than two-thirds of the surface being drained by the Sihl and the Lake of Zürich; a third, by the Lake of Luzern, chiefly by means of the Muotta; and the remainder, forming only an unimportant portion, by the Lake of Zug. The chief industry is the rearing of cattle, sheep, and swine. The canton is very poor in minerals. Manufactures are almost confined to some cotton and silk spinning and weaving. Schwyz being the most important of the cantons which first threw off the yoke of Austria, gave the name to the whole confederation. Its present government is an extreme democracy, the whole power, legislative and executive, being lodged in the male population of legal age, who hold a general assembly every two years. The great body of the inhabitants are Roman Catholics. Pop. 50,307.—SCHWYZ, the capital, is a straggling and picturesque town at the foot of the Mythen, about 1680 feet above the sea, with a fine parish church and an interesting town-hall. Pop. 6663.

Sciacca (shak'kà), a seaport of Sicily, on the side of a hill rising from the shore, 30 miles W.N.W. of Girgenti. It is surrounded by old fortifications, has an old cathedral, and interesting mediæval building; but the trade is small. Pop. 19,965.

Sciæ'na, a genus of teleostean fishes, belonging to the Acanthopteri, and forming the type of a family—the Sciænoids, allied to the perches. The most important of the genus is the *S. aquila,* the *maigre* of the French, whose chief habitat is the Mediterranean. See *Maigre.*

Sciat'ica, a term used in medicine to denote a rheumatic affection, in which the pain stretches along the course of the great sciatic nerve, that is, from the hip along the back part of the thigh towards the ham of the leg. There is stiffness and pain, increased by any change of temperature and moisture; there is generally swelling of the limb at the commencement of the disease, but after repeated attacks the limb seems to shrink, owing to the wasting of the muscles. In some cases the articulation of the hip seems affected, and permanent immobility of the limb takes place.

Scicli (shik'lē), a town of Sicily, prov. of Syracuse. Pop. 11,842.

Science and Art, DEPARTMENT OF, a special branch of the education department of Britain, having control over the Normal School of Science and Royal School of Mines, South Kensington and Jermyn Street, London; the National Art Training School, South Kensington; numerous schools of science and art throughout the country,

which receive payments on results, grants in aid, &c.; the South Kensington Museum, the Indian Museum, and the Museum of Practical Geology, London; the Museums of Science and Art at Edinburgh and Dublin, the Dublin Royal College of Science, and the Geological Survey of the United Kingdom. It has a staff of examiners and inspectors, and has power to expend sums in circulating science and art objects amongst country institutions and in affording conditional aid in fostering local effort.

Sciences, a term applied to the generalized and systematized divisions of knowledge. Science and philosophy resemble each other in so far as they both have to do with knowledge; but while the latter deals with the whole sum of knowledge, the former takes up special branches of it, and it does not necessarily go back to first principles like philosophy. Given a sufficient number of inter-related facts, they may be so arranged and classified, by referring them to the general truths and principles on which they are founded, as to constitute a well-certified and more or less complete branch of knowledge, that is, a science. The sciences are broadly divided into pure or theoretic sciences and applied or practical sciences, the latter being definable as the knowledge of facts, events, or phenomena as explained, accounted for, or produced by means of powers, causes, or laws; the former as the knowledge of these powers, causes, or laws, considered apart or as pure from all applications. To the class of pure or fundamental sciences belong mathematics, physics, chemistry, psychology, and sociology; to the applied or concrete belong geology, mineralogy, botany, zoology, meteorology, geography, ethics, politics, law, jurisprudence, logic, grammar, rhetoric, philology, and political economy; navigation, engineering, and practical mechanics; surgery, midwifery, materia medica, &c.

Scilly Islands (sil'i), a group of granitic islands belonging to England, forming part of the county of Cornwall, at the entrance to the English Channel, about 30 miles west by south of Land's End. They rise abruptly from a deep sea, form a compact group about 30 miles in circumference, and are said to amount altogether to about 140 in number (total area 3560 acres); but there are only six of any importance, the remainder being mere rocks and islets. The six alluded to are St. Mary's, St. Agnes, St. Martin, Trescow, Bryher, and Sampson. The government is chiefly managed by twelve of the principal inhabitants, the Court of Twelve, sitting at Hugh Town, St. Mary's. The climate is warm and moist, and large quantities of early vegetables and spring flowers are raised for the London market. Trees are hardly to be seen. Many of the inhabitants are pilots or fishermen. On several of the islands are remains of rude pillars, circles of stones, kistvaens, and cromlechs. The islands are the property of the crown, belonging to the Duchy of Cornwall. Pop. 2160.

Scimitar, a kind of sword in use among eastern nations. The blade is nearly semicircular in form, with the edge upon the convex side. This form, while ill adapted for thrusting, is admirably adapted for striking.

Scinde. See *Sind.*

Scindia's Dominion. See *Sindhia's Dominion.*

Scio, or **Skio** (si'ō; skē'ō; ancient *Chios*), an island of Asiatic Turkey, in the Ægean Sea, separated from the coast of Asia Minor by a channel not more than 7 miles wide where narrowest, and about 53 miles west of Smyrna. It is of a somewhat quadrangular form, 32 miles long from north to south, with a mean breadth of about 12 miles; area, 508 square miles. The surface exhibits a number of limestone ridges, separated from each other by verdant and fertile valleys. There are no perennial streams; but an abundant supply of water is obtained from wells. The principal products are wine, oil, cotton, silk, oranges, and other fruits, and more especially mastic. The quantity of cereals is very limited. Pop., of whom a large portion are Turks, about 70,000. Before the war of Greek independence Scio was peopled almost entirely by Greeks, of whom large numbers were massacred by the Turks after their subjugation in 1822. Scio contends for the honour of having given birth to Homer. It possesses few antiquities. In April 1881 the island suffered much from repeated shocks of earthquake.

Scio, or **Kastro**, the chief town of the island of Scio, situated near the middle of the east coast, is defended by a castle, and carries on a considerable trade. Its harbour, formed by two moles, has two lighthouses. Pop. 14,500.

Sciop'pius, properly **Kaspar Schoppe**, German theological controversialist, born 1576. He studied at Heidelberg, Altdorf, and Ingolstadt, and afterwards, in 1589,

travelled in Italy, where he renounced Protestantism, the whole of his subsequent career being marked by venomous attacks on his former co-religionists. The Jesuits likewise came in for a share of his hate. His rancorous life terminated in 1649. His works are stated at over one hundred.

Scio'to, a river of Ohio, in the United States. Its general course is south, its length about 200 miles, and it flows into the Ohio River by a mouth 150 yards wide, between Portsmouth and Alexandria. It is navigable for boats about 130 miles, and is connected with the Sandusky by a portage 4 miles long.

Scip'io Africa'nus, THE ELDER, PUBLIUS CORNELIUS SCIPIO AFRICANUS MAJOR, one of the most illustrious of Roman warriors, was born about 235 B.C. At the battle of the Ticinus against the Carthaginians in 218 B.C. he is said to have saved the life of his father. Two years later he was one of the few who escaped from the fatal battle of Cannæ, when he succeeded in gathering together the remains of the defeated army and saving Rome. In 212 B.C. he was unanimously elected ædile, and a few years after was appointed proconsul in Spain. His first successful enterprise of importance was the conquest of New Carthage, the stronghold of the Carthaginians in Spain. The next year (209 B.C.) Scipio totally defeated Hasdrubal, Hannibal's brother, and subsequently a fresh army, led by Mago and Hasdrubal the son of Gisco. The result was to drive the Carthaginians wholly from Spain, and Scipio was empowered to lead an army against Carthage herself. The Carthaginians recalled Hannibal from Italy, but the great battle of Zama, fought 19th October, 202 B.C., resulted in the total defeat of the Carthaginians, who, on the advice of Hannibal, sought for peace. On his return to Rome Scipio was honoured with a triumph, and received the surname of *Africanus*. After this he discharged, in a praiseworthy manner, the office of censor; but lost the favour alike of the old Roman party and the new. After the successful close of the war with Antiochus, king of Syria, in B.C. 189, Scipio retired into private life. He was not long permitted to rest, however, without experiencing the enmity of a party in the state who were hostile to him. First his brother Lucius was imprisoned and his property confiscated, on an alleged charge of misconduct in his dealings with Antiochus. This was followed up by charges brought against Scipio himself. When his trial came on he made no reply to these charges, but merely narrated all that he had done for the republic, and reminding them that this was the anniversary of the battle of Zama, called upon the people to follow him to the Capitol, there to return thanks to the immortal gods, and pray that they would grant the Roman state other citizens like himself. The people immediately followed him, leaving the accusers alone in the forum. Scipio immediately quitted Rome, and retired to his villa at Liternum, where he died, it is believed, in B.C. 183, the same year as his great opponent Hannibal.

Scip'io Africa'nus, THE YOUNGER, PUBLIUS CORNELIUS SCIPIO ÆMILIANUS AFRICANUS MINOR, son of L. Æmilius Paullus, the conqueror of Macedonia, and adopted son of P. Cornelius Scipio, the son of Scipio Africanus Major, was born about 187 B.C. In B.C. 152 he accompanied the consul Lucius Licinius Lucullus to Spain as military tribune, and in B.C. 149, on the outbreak of the third Punic war, commanded in Africa under the consul M. Manlius Nepos. His services were so important that in B.C. 147, contrary to the usual custom, not being of the legal age, he was unanimously chosen consul and leader of the forces against the Carthaginians. In B.C. 146 he took, and by command of the senate burned Carthage, for which he was honoured with a triumph at Rome and with the surname of *Africanus*. In B.C. 142 he was elected censor, and in B.C. 134 entered on his second consulship, in order to put an end to the war with Numantia in Spain. For his conquest of this powerful city a triumph was decreed to Scipio, and he received the surname of *Numantinus*. In the last years of his life he made himself many enemies among the people by opposing the measures of the popular party, and especially the agrarian law of Tiberius Gracchus, of which Papirius Carbo, and C. Gracchus, the tribunes of the people, were the great supporters. He was found dead in his bed in B.C. 129, Carbo being suspected of having murdered him. He was a friend of Polybius, the historian, and a patron of Terence.

Sci're fa'cias (Lat. 'cause him to know'), a judicial writ to enforce the execution of judgments, &c., directed against a person who is called upon to show cause why something should not be done on behalf of the party in whose interest the writ is issued.

Scirpus. See *Bulrush.*

Scirrhus, or HARD CANCER, is the most frequent variety of cancer. It has its seat sometimes in the stomach, rectum, and elsewhere; but by far most frequently it attacks the female breast. If detected in time it can be removed from the breast with every prospect of success.

Scissor-bill (*Rhynchops nigra*), a genus of Laridæ or gulls, so named from the possession of an elongated beak of compressed form, the lower mandible exceeding the upper one in length, and shutting into the latter somewhat after the fashion that the blade of a knife does into its handle. This curious beak is of an orange colour at its base, and black at its tip. The bird, which inhabits the coasts of America and Africa, is a dark brown on the upper aspect of the head and body; the under surface white, and a band of white across the wings. The average length of the scissor-bill is about 1½ foot.

Sclavonia. See *Slavonia.*

Sclerodermic and Sclerobasic Coral, the two great varieties of corallum, or coral substance (see *Coral*) secreted by the Actinozoa, or highest group of cœlenterate organisms.

Sclerotic Coat. See *Eye.*

Scole'cida, Huxley's name for a provisional class of annuloids, comprising the *Platyelmia,* or flat-worms; *Nematelmia,* or round-worms; and *Rotifera,* or wheel-animalcules. The Platyelmia include the orders *Tæniada* (tape-worms), *Trematoda,* or flukes, and *Turbellaria* (non-parasitic forms such as Planaria and Nemertidans); the Nematelmia are represented by the orders *Acanthocephala* (thorn-headed worms), *Gordiacea,* or hair-worms, and *Nematoda,* or round-worms. The Rotifera are non-parasitic, free organisms, which differ in many respects from the rest of the Scolecida. The Scolecida are characterized by the possession of a water-vascular system, consisting of a remarkable set of vessels which communicate with the exterior by one or more apertures situated upon the surface of the body, and branch out, more or less extensively, into its substance. The nervous system (when present) consists of one or two closely approximated ganglia.

Scolopac'idæ, the family of birds to which the snipe and woodcock belong.

Scolopendra. See *Centipede* and *Myriapoda.*

Scolopendrium. See *Hart's-tongue.*

Scomber. See *Mackerel.*

Scone (skön), NEW, a village of Scotland, 2 miles N.E. of Perth, on the Tay. The village of New Scone contains 1483 inhabitants. Of Old Scone the principal remains are a market-cross. Its ancient abbey, in which the kings of Scotland were wont to be crowned on the stone of destiny, now in Westminster Abbey, is only represented by inconsiderable ruins.

Scopas, an eminent sculptor and architect of ancient Greece, belonging to the island of Paros, flourished about 390–350 B.C., a contemporary of Praxiteles.

Score, in music, the original draught, or its transcript, of a musical composition, with the parts for all the different voices or instruments arranged and placed in juxtaposition; so called from the practice of drawing the bar through all the parts.

Scoresby, WILLIAM, an Arctic navigator, born at Cropton, in Yorkshire, 1789. He made his first voyages with his father, a daring and successful commander in connection with the northern whale-fishery, to whom he latterly acted as chief mate. During the winter months when the vessel was in port, he attended classes in Edinburgh University. On the resignation of his father in 1811 he was appointed to succeed him as captain of the *Resolution.* Through information communicated by him to Sir Joseph Banks, the government was induced in 1817 to fit out an expedition under Sir John Ross to discover the north-west passage. In 1820 Captain Scoresby published a work entitled An Account of the Arctic Regions, with a History and Description of the Northern Whale-fishery, which established his reputation as one of the most original observers and scientific navigators of the day. It was followed in 1823 by a Journal of a Voyage to the Northern Whale-fishery, including Researches and Discoveries on the Eastern Coast of West Greenland. About the same time he quitted the whale-fishing. In 1824 he was elected a fellow of the Royal Society. He then entered himself as a student for the church at Queen's College, Cambridge, took his degree of B.D. in 1834, and shortly afterwards received holy orders with the degree of D.D. His first charge was the Mariner's church at Liverpool, then just established, and from this he afterwards removed first to Exeter, and then to Bradford, in Yorkshire, of which he acted as vicar for several years. Latterly he resigned this office, and retired to Torquay, in Devonshire, where he died on 21st March, 1857, at the age of sixty-eight. Throughout his life he had a

keen interest in scientific investigation, especially in that of magnetism and its relation to navigation. Various treatises were published by him, afterwards collected under the title of Magnetical Investigations, of which the first part appeared in 1839, the second in 1843, and the third in 1852. He also published a treatise entitled Zoistic Magnetism (Mesmerism), a life of his father, The Franklin Expedition, and other works.

Scorpion, the name of animals of the class Arachnida (which includes also the spiders)—order Arthrogastra or Pedipalpi, the largest of their class. Scorpions have an elongated body, suddenly terminated by a long slender tail formed of six joints, the last of which terminates in an arcuated

Scorpions.
1, *Buthus occitanus*. 2, *Scorpio Cæsar*.

and very acute sting, which effuses a venomous liquid. This sting gives rise to excruciating pain, but is usually unattended either with redness or swelling, except in the glands of the arm-pit or groin. It is very seldom, if ever, fatal to man. The animal has four pairs of limbs borne by the thorax or chest-segments, and the maxillary palpi (organs of touch belonging to the maxillæ or lesser jaws) are largely developed, and constitute a formidable pair of nipping claws. With these claws they seize their insect prey, which is afterwards killed by the sting. The eyes, which are of the simple kind, number six, eight, or twelve. The female scorpions are said to exhibit great care for their young, and carry them on their backs for several days after being hatched, whilst they tend them carefully for about a month, when they are able to shift for themselves. Scorpions generally live in dark places, and under stones. They are found in the south of Europe, in Africa, in the East Indies, and in South America, several genera (*Androctonus*, &c.) being comprised within the order. The *Buthus afer*, or rock scorpion (which see) of Africa, is one of the most familiar species. Of those represented in the cut *Scorpio Cæsar* is a native of West Africa, *Buthus occitānus* of Syria. The scorpions are first represented in a fossil state in the carboniferous period. The book scorpions (Cheliferidæ), of which a common species is the *Chelifer Wideri*, are so named from their presenting a close resemblance in outward form to the true scorpions. The book scorpions are, however, much smaller, and are included in another group (*Trachearia*) of the class Arachnida, whilst they want the jointed tail of the true scorpions. They are generally found living amongst old books, and feed on the minute insects which also inhabit such situations.

Scorpion-fish, or Sea-scorpion (*Scorpæna*), a genus of teleostean (acanthopterous) fishes, belonging to the Triglidæ or gurnard family. The first dorsal fin possesses eleven spines, the second dorsal possessing one spiny ray and nine or ten soft rays. The anal fin is short, and has three spines and five soft rays. The red scorpion-fish (*Scorpæna scrofa*) is a familiar form. The spotted scorpion-fish (*S. porcus*) is a second species, and, like the preceding form, occurs in British waters, as well as in the Mediterranean, Atlantic, and the tropical seas.

Scorpion-fly (*Panorpa*), a genus of insects belonging to the order Neuroptera, or that of the dragon-flies. The name scorpion-fly is derived from the appendages seen attached to the abdomen of some species. The male in the common species, for example, has the sixth and seventh joints of the abdomen attenuated, and capable of extensive motion; whilst the last joint forms a pair of forceps resembling those of the earwigs. When at rest this tail is curled over the back, but when irritated the forceps are used as weapons of offence or defence.

Scorpion-shell, the name given to the shells of certain gasteropodous mollusca, belonging to the family Strombidæ, from the projecting spines with which the shells are provided. These shells are also known by the name of 'spider-shells' for the same reason. They are chiefly found in the Indian and Chinese Seas.

Scorzone'ra, a genus of plants of the natural order Compositæ, sub-order Chicoraceæ, with yellow and occasionally rose-coloured flowers. The species, which are numerous, are chiefly indigenous to Southern Europe and the East. The common scor-

zonera (*S. Hispanica*), a native of Spain and the south of Europe, has long been cultivated in English kitchen-gardens for its edible roots, which are carrot-shaped, but small and dark-coloured, though pure white within. They possess cooling and antifebrile properties, and are said to be often highly beneficial in cases of indigestion or biliousness. The name viper's grass is sometimes given to this plant, either from the shape of the root, or from its supposed properties of curing snake-bites. *S. deliciosa* is a species much cultivated as an esculent at Palermo.

Scot, REGINALD or REYNOLD, one of the first and boldest writers against the belief in witchcraft, alchemy, astrology, and other prevalent superstitions of his time, a younger son of Sir John Scot of Scotshall, in Kent; born in the early part of the 16th century. He studied at Oxford, and spent his life in the study of old and obscure mystical authors, and the pleasures of gardening, until his death in 1599. The work on which his reputation is founded is entitled The Discoverie of Witchcraft, and was published in 1584. By order of James I. the first edition of the book was burned by the common hangman, and the king replied to it in his Demonology. Refutations were also published by Meric Casaubon, Joseph Glanvil, and others.

Scot and Lot, an old legal phrase applied originally to the payment of parish assessment according to ability. In certain English boroughs persons paying such assessments voted for members of parliament.

Scoter, or SURF DUCK (*Oidemia*), a genus of sea-ducks. The most familiar species is the common or black scoter (*O. nigra*), which shows a deep black plumage in the male, the bill and legs being of the same colour. The upper mandible is marked on its dorsal surface by a line of orange colour. This bird averages the common duck in size; and the females are coloured of a dark-brown hue. It occurs in the Arctic regions in summer, but comes southwards to the British coasts in winter.

Scotists. See *Duns, John,* and *Scholasticism.*

Scotland, the northern division of the Island of Great Britain, between lat. 54° 38′ and 58° 40′ 30″ N.; and lon. 1° 46′ and 6° 8′ 30″ W. It is separated from England substantially by the Solway, Cheviots, and Tweed, the border isthmus being about 60 miles across; but the irregular boundary line measures fully 100 miles. On all other sides it is bounded by the sea. The greatest length, from N.N.E. to S.S.W., between Dunnet Head and the Mull of Galloway, is 287 miles. The breadth varies from 140 miles to less than 30, the latter in the north, between Dornoch Firth and Loch Broom. Few points in the mainland are more than 40 miles from the sea, the country being so much penetrated by inlets. The country was formerly divided into a number of districts, many of the names of which are still familiar, such as Lothian, Tweeddale, Galloway, Breadalbane, &c., but for political purposes it is now divided into the following shires or counties:—

Counties.	Area in sq. miles.	Pop. 1881.	Pop. 1891.
Aberdeen	1,955	267,990	284,036
Argyle	3,213	76,468	74,085
Ayr	1,128	217,519	226,386
Banff	640	62,736	61,684
Berwick	460	35,392	32,290
Bute	217	17,657	18,404
Caithness	685	38,865	37,177
Clackmannan	47	25,680	33,140
Dumbarton	241	75,333	98,014
Dumfries	1,062	76,140	74,245
Edinburgh	362	389,164	434,276
Elgin or Moray	475	43,788	43,471
Fife	492	171,931	190,365
Forfar or Angus	875	266,360	277,735
Haddington	271	38,502	37,377
Inverness	4,088	90,454	90,121
Kincardine	383	34,464	35,492
Kinross	72	6,697	6,673
Kirkcudbright	897	42,127	39,985
Lanark	881	904,412	1,106,899
Linlithgow	120	43,510	52,808
Nairn	195	10,455	9,155
Orkney and Shetland	926	32,044 29,706	30,453 28,711
Peebles	354	13,822	14,750
Perth	2,527	129.007	122,185
Renfrew	245	263,374	230,810
Ross and Cromarty	3,078	78,547	78,727
Roxburgh	665	53,442	53,500
Selkirk	257	25,564	27,712
Stirling	447	112,443	118,021
Sutherland	2,027	23,370	21,896
Wigtown	486	38,611	36,062
Total	29,785	3,735,573	4,025,647

Four towns, Edinburgh (the capital), Glasgow, Dundee, and Aberdeen, each contain upwards of 100,000 inhabitants. Among the more important of the other towns are Greenock, Paisley, Perth, Inverness, Stirling, Kilmarnock, and St. Andrews.

Islands and Coasts.—The islands of Scotland are said to number altogether nearly 800. On the east coast they are few and small; but on the north-east are the two large groups of the Orkneys and Shetlands,

the former numbering 52 islands, 28 permanently inhabited; the latter 100 islands, 29 inhabited; while on the west coast the islands are large and numerous. Here the Hebrides extend for 200 miles from north to south, and are divided into the *Inner* and *Outer Hebrides*, the former lying close to the western coast of the mainland and stretching from Skye to Islay; the latter, parted from the Inner Hebrides by the straits of the Minch and the Little Minch, comprise the long chain of islands from Lewis to Benbecula. Inclosed in the Firth of Clyde are the islands of Arran, Bute, and the Cumbraes, forming a county by themselves. The west coast of the mainland is generally a wild, deeply-indented mountain-wall, presenting a series of inlets or sea lochs, while towards the middle the coast is cleft by two great inlets with openings to the south-west, the Firth of Lorn and its continuation Loch Linnhe, and the Firth of Clyde and its ramifications running far inland. The east coast is sometimes low and sandy, but is often formed of steep rocky cliffs of considerable elevation, the chief inlets being the Firths of Forth and Tay, and the Moray Firth, Cromarty Firth, &c.

Surface.—Both from the configuration of the surface and the geological structure the country divides into three divisions, the Highlands, Central Lowlands, and Southern Uplands. The first of these divisions lies north of a line stretching in a S.W. direction from the coast of Kincardineshire to the Firth of Clyde; the third is the country S. of a line drawn from Dunbar south-westerly to Girvan; the country between these lines forms the Central Lowlands. The Highland division is remarkable for the number and elevation of its mountain-masses, many of the summits being over 4000 feet high. The mountains best known by name are the Grampians, which form a system or series of masses covering a large area, and culminating on the west coast in Ben Nevis, 4406 feet high; while 55 miles to the north-east rises a remarkable cluster of summits reaching in Ben Macdhui the height of 4296 feet. The Grampians and their connections are separated from the mountains farther to the north by Glenmore or the Great Glen of Scotland, a remarkable depression stretching quite across the country from sea to sea, and forming, by the series of lakes occupying it and the Caledonian Canal connecting them, a waterway from the west coast to the east. The Southern Uplands are also essentially a mountainous region, summits of over 2000 feet being frequent, though none exceed 3000 feet above the sea. The Central region, though much less elevated than the other two divisions, has none of the monotony usual in flat countries. Though occupying not more than a sixth of the whole surface, the fertility of the soil and its mineral treasures make this part by far the wealthiest and most populous. The present form of the land surface of Scotland is the effect of erosion or denudation. The country was at one time an elevated table-land, the upper surface of which is indicated by the summits of the mountain-masses, but has been deeply trenched and furrowed in all directions by the erosive action of water, ice, and frost. The slope of the ancient plateau may be determined by the direction of the principal rivers; in the northern part it is chiefly towards the east, in the southern more equally east and west.

Rivers and Lakes.—The chief rivers flow (roughly speaking) to the east, and enter the German Ocean, the largest being the Tweed, Forth, Tay, South Esk, North Esk, Dee, Don, Deveron, Spey, Findhorn, &c.; those entering the sea on the west are the Clyde, Ayr, Doon, Dee, Nith, Annan, and Esk. The Tay carries to the sea a larger quantity of water than any river in Britain, but neither it nor most of the others, except when they form estuaries, are of much use for navigation. The Clyde, however, in its lower course carries a vast traffic, this being rendered possible chiefly by dredging. Many of the rivers are valuable from the numbers of salmon they produce. A striking feature of the country is the great multitude of lakes, varying in size from Loch Lomond (28 square miles) to the pool-like mountain tarns. In the Northern Highlands almost every glen has its lake and every mountain hollow is filled by a stream or spring. Among the more noted are Lochs Lomond, Katrine, Tay, Earn, Rannoch, Awe, Shiel, Laggan, Lochy, Ness, Maree, Shin, in the Western and Northern Highlands; Loch Leven, in the Central Lowlands; and St. Mary's Loch, Lochs Ken, Dee, and Doon in the Southern Uplands.

Geology.—As regards geology the older or palæozoic rocks predominate almost everywhere in Scotland. The Highlands are composed almost entirely of crystalline schists, gneiss, and quartzites; the Central Lowlands of old red sandstone, carboniferous, and Per-

mian strata; the Southern Uplands mostly of rocks of Silurian age. In certain localities remains of secondary formations are represented over small spaces, while volcanic rocks cover considerable areas. Granite exists in great masses in many localities, and in some parts is extensively quarried. The most valuable mineral region is the Central Lowlands, where coal and iron exist in such quantity as to make this one of the most important mineral fields of Great Britain.

For *Agriculture, Manufactures, Trade,* &c., see *Britain.*

Political Constitution.—The parliament of Scotland anciently comprised all who held any portion of land, however small, from the crown by tenure of military service, till the reign of James VI., when the small barons or freeholders were excused from attendance in person, 'two or more wise men' being deputed from each county in proportion to its size. Its powers were nominally extensive, but the supreme power was virtually in the king, who by his influence often entirely controlled its proceedings. The parliament in the whole consisted of three estates—the nobility, the dignified clergy (consisting of bishops, abbots, and priors), and the lesser barons, or representatives of shires and burghs. When Presbyterianism was formally ratified by law after the revolution of 1688, the ecclesiastical estate ceased to have a place in parliament. Every measure brought before parliament was previously prepared by a committee, styled the lords of the articles, chosen from each of the three orders, but in effect little better than royal nominees. Before the Union there were four great officers of state—the lord high-chancellor, the high-treasurer, the lord privy-seal, and the secretary; and there were also four lesser officers —the lord clerk-register, the lord-advocate, the treasurer-depute, and the justice-clerk. Previously to the era of the Revolution the privy-council of Scotland assumed inquisitorial powers, and even torture was administered under the sanction of its authority; but it is now entirely merged in the privy-council of Great Britain. The number of peers in the Scottish parliament was latterly 160, and of commons 155, and all sat in one house, and voted promiscuously. At the union of the kingdoms the political system of Scotland was almost entirely incorporated with that of England. See *Britain, Parliament.*

The Court of Session is the supreme civil court of Scotland. (See *Session, Court of.*) The Court of Justiciary, or criminal court, composed only of judges of the Court of Session, is supreme in the highest sense, since its decisions in criminal cases are not subject to any review. The principal subordinate judicatories are sheriff-courts, established in each county or stewartry. Sheriff-substitutes, or judges ordinary, one or more holding separate courts in different districts, decide in the first instance, subject to the review of the principal sheriff or sheriff-depute, whose decisions, though final within the limits of his jurisdiction, are reviewable by the Court of Session, with the exception of classes of cases provided for by special statutes. Besides the sheriff-court, each county or district of a county has its justice of peace courts, in which judges, not stipendiary, decide on principles of equity in minor crimes; and in every town of any importance are bailie, dean of guild, and police courts, with limited jurisdictions.

Education.—Scotland has had the advantage of a national system of elementary education for over two centuries, a school having been established in every parish by a law of 1696 (where such a school was not already established), according to a system proposed by John Knox long before. (See *Parish School.*) This scheme did effective service for the education of the people, till the great increase of population, especially in towns, rendered it unequal to the task laid upon it, and this notwithstanding the erection of many schools by various religious denominations. By the passing of the Education Act of 1872 board-schools have superseded the old parish schools (see *Britain*), there being also numerous grammar or high schools and academies in every town of any size, though no systematic scheme of secondary education. Other institutions are the normal or training schools and colleges of the different religious bodies, and the four universities of Edinburgh, Glasgow, Aberdeen, and St. Andrews. The first university was that of St. Andrews, dating from 1411; next came that of Glasgow (1450), then King's College and University Aberdeen (1494), then Edinburgh University (1582), lastly Marischal College and University Aberdeen (1593). The two Aberdeen universities were united in 1860. In board-schools now education is practically free.

Civil History.—The country now called Scotland emerges from pre-historic obscurity

during the Roman occupation of Britain, though for many centuries little is known of its history. It is supposed that the earliest inhabitants of the country were a non-Aryan race resembling the Iberians, and typified now by the Basques. A Celtic (and Aryan) people seem subsequently to have entered the country, and to have gained predominance over the non-Aryans, the combined people occupying at the Roman invasion (see *Britain*) most of the country north of the Forth and Clyde estuaries, which was called Caledonia by the Romans, and its people Caledonians. The southern part of the country was inhabited by another Celtic race, the Brythons or Britons, of the same blood as the Welsh. The descendants of the Caledonians were afterwards called Picts, and were the predominant people in North Britain at the beginning of the 6th century, when a colony of Scots or Dalriads from Ireland effected a settlement in Argyle, and gradually spread over the adjacent regions. It is from these Scots (a Celtic and Gaelic-speaking people) that the country afterwards received the name of Scotland, the original Scotland (Scotia) being Ireland. The Pictish tribes were divided into two great sections, the *Piccardach* or Southern Picts, and the *Cruithne* or Northern Picts. In the 9th century the Dalriadic Scots with the help of the Cruithne conquered the Southern Picts, but the Northern Picts, the ancestors of the modern Highlanders, still retained their independence. The Teutonic element was introduced into Scotland as early as the 4th century, when bands from North Germany seem to have formed settlements on the east coast south of the Firth of Forth; and this part of the country was subsequently united to the Anglian kingdom of Northumbria, which extended from the Forth to the Humber. To the west of this kingdom, from Dumbarton to the Solway and into England, extended the kingdom of Strathclyde or Cumbria, inhabited by Romanized Britons.

About the middle of the 9th century Kenneth MacAlpin, son of a ruler of a body of Scots established in Galloway, but of Pictish descent through his mother, united in his own person the sovereignty of both the Picts and the Scots. The Norsemen had already established a footing on the islands of the north and west coasts as far south as the Isle of Man, and a Norse earldom of Orkney was established. Kenneth's kingdom comprised Central Scotland (Argyle, Perth, Angus, Mearns, and Fife), with Scone as capital, the north of Scotland being mostly under independent chiefs, or maormors. The reigns of Kenneth and his immediate successors, Donald I., Constantine I., Grig, Donald II., Constantine II., Malcolm I., Kenneth II., Malcolm II., Duncan, and Macbeth, were one continued scene of warfare with the Norsemen on one hand and with the Britons of Strathclyde and the English of Northumbria on the other. Malcolm I. (943–954) obtained Cumbria (Strathclyde) as a territorial fief from Edmund I., and in 1018 his grandson, Edmund II., secured Lothian, hitherto part of Northumbria, two events which materially influenced the after history of Scotland.

On the advent of Malcolm Canmore (1058) to the throne after the death of Macbeth, the able usurper and murderer of Duncan (see *Macbeth*), the purely Celtic monarchy came to an end. Malcolm's mother, the wife of Duncan, was an Anglo-Dane, sister of Earl Siward of Northumbria, and his youth had been spent at the court of Edward the Confessor. The conquest of England by William of Normandy involved Malcolm in many a serious struggle. Edgar Atheling, the heir of the English line, and many of the English nobles, sought and found refuge in Scotland. Malcolm married Margaret, the sister of the fugitive prince, who is said to have introduced into her court a degree of refinement remarkable for that time. The Scotch king twice invaded England with success, but William, having collected a large army, in his turn advanced into Scotland, and compelled Malcolm to do homage for those lands which he held within what was accounted the English territory. Malcolm Canmore and his eldest son were slain in attempting to take Alnwick Castle in 1093, and Margaret survived only a few days.

On the death of Malcolm the Celtic tribes placed his brother Donald Bane on the throne, but he was driven from it before he had reigned a year by Duncan, a natural son of the late king, who now seized the sceptre. In 1098, however, Edgar Atheling, obtained a force from the English king, and succeeded in gaining the kingdom for Edgar, the lawful son of Malcolm. Edgar was succeeded by his brother Alexander I., a prince whose reign is chiefly signalized by his severe administration of justice. He assisted Henry I. of England, who had married his sister, in a war with the Welsh,

and died in 1124, leaving the throne to his younger brother David. David had reigned over Cumbria as earl or prince since the death of Edgar; he married a daughter of the Earl of Northumberland, became Earl of Huntingdon, and through this and his guardianship of the earldom of Northampton on behalf of his stepson, he was brought into feudal relations with the Norman king of England. On the accession of the usurper Stephen to the English throne in 1135, to the prejudice of Maud or Matilda, wife of the Emperor Henry V., only child of Henry I. and niece of David, the latter made several expeditions into England in support of his niece's claim to the throne, during which he suffered an indecisive defeat near Northallerton (Battle of the Standard, 1137). He acquired a great reputation for sanctity, having founded several new abbeys, including those of Holyrood and Melrose, and reorganized most of the Scotch bishoprics. His services to the church procured him canonization, but his endowments so taxed the royal resources that he was bitterly characterized by James VI. as a 'sair sanct for the crown.' His death in 1153 was preceded by that of his only son, so he was succeeded by his grandson, Malcolm the Maiden, whose reign of twelve years is only remarkable for his giving up Northumberland and Cumberland to the English king.

On the death of Malcolm IV. in 1165 the crown fell to his younger brother William, who is known by the title of William the Lion. During an expedition into England for the purpose of regaining Northumberland he was taken prisoner (1175), and sent to Falaise in Normandy, where a treaty was concluded acknowledging the supremacy of England, and declaring Scotland a fief and himself a vassal of the English crown. This treaty remained in force till 1189, when Richard I. restored Scottish independence for the sum of 10,000 marks in order to equip a force to join the third crusade. The rest of William's reign was devoted to the consolidation of his kingdom in the north and west. The Scotch alliance with France, and many of the Scottish burgh charters, date from this reign.

His son and successor, Alexander II. (1214–49), a youth in his seventeenth year, took the side of the English barons in their struggle with King John, in the hope of recovering the Northumbrian and Anglo-Cumbrian provinces. After much blood had been shed, and the border lands repeatedly devastated, Henry III. agreed in 1237 to give the King of Scots certain manors in Cumberland and Northumberland, not in sovereignty, but in feudal property. This was accepted, and a border line was laid down which has never since been altered to any considerable extent. The rest of Alexander's reign was spent in extending his authority more firmly over the territory north of the Moray Firth and in the Western Highlands.

His son Alexander III. (1249–1286) succeeded in the eighth year of his age, and his minority was characterized by a series of contests between an English and national party for the regency, which ultimately fell to the queen dowager and her husband the Earl of Menteith. In his twelfth year he was married to his cousin Margaret, daughter of Henry III. One of the chief events of his reign was the war that broke out with Haco of Norway for the possession of the Western Islands, which ended in the victory of the Scots at Largs (1263), and the consequent cession of the Isles to Scotland (1263). In 1284 the king was left childless, and a meeting of the Estates at Scone settled the crown on the Maid of Norway, daughter of Eric, king of Norway, and Alexander's daughter Margaret. Alexander was killed by a fall from his horse near Kinghorn in Fife (1286). A fragment commemorative of his death, and evidencing the prosperity of Scotland during his reign, has been preserved in Wyntoun's Chronicle, and is the earliest known specimen of Scottish poetry.

Margaret of Norway was only three years old at Alexander's death, and a regency consisting of four barons and two bishops was appointed. Edward I., desirous of joining the two countries in one kingdom, proposed that a marriage should take place between the young queen and his son (afterwards Edward II.). This was agreed to by a treaty signed at Brigham near Roxburgh, which made strict provision for the independence of Scotland. The scheme, however, was frustrated by the death of Margaret in one of the Orkneys when on her way to Scotland (Sept. 1290). On the death of Margaret a host of rival claimants for the throne appeared, all of whom ultimately gave way to three descendants of David, earl of Huntingdon, brother of William the Lion. John Baliol claimed as grandson of David's eldest daughter, Robert Bruce as son of David's second daughter, and David de Hastings as grandson of the third daughter. Edward I.

being asked to settle the dispute decided in favour of Baliol, who was crowned at Scone (1292) acknowledging Edward as his overlord. On the outbreak of war between England and France the weak monarch was compelled by his nobles to enter into an offensive and defensive alliance with France, and to formally renounce his allegiance to Edward (1296). Edward immediately invaded Scotland, stormed and took Berwick, and reduced the fortresses of Dunbar, Roxburgh, Edinburgh, and Stirling. Baliol surrendered in the neighbourhood of Brechin, and Edward after marching north, probably as far as Elgin, returned to Berwick to receive the homage of the Scotch bishops, barons, and knights. Baliol himself was committed to the Tower of London. Scotland was now occupied by English garrisons and placed under English officials; and Edward seemed to have entirely accomplished his cherished purpose, when Wallace, the man of the people, appeared.

William Wallace, younger son of Sir Malcolm Wallace of Elderslie, first came forward in a private quarrel with Haselrig, English governor of Lanark, which developed into a successful rebellion in the south-west and centre of Scotland. Assisted by some of the barons and a considerable body of men, he defeated the English governor, the Earl of Surrey, at Stirling Bridge (11th September, 1297), drove Edward's garrisons out of the country, and made a raid into England. He assumed the title of Guardian of Scotland in the name of Baliol, and directed his energies to rectify the abuses and disorders of the country, and to revive the trade with the free towns of the Continent. Edward, who was in Flanders, hastened home, and marching at the head of a large army, defeated Wallace at Falkirk (22d July, 1298), and before 1303 had repossessed himself of the whole country. In 1305 Wallace was betrayed into the hands of the English near Glasgow by Sir John Menteith; was carried to London, and after a mock trial was condemned as a rebel and traitor to Edward and executed (23d August, 1305).

Wallace soon had a more fortunate, though not a more valiant, successor in Robert de Bruce, earl of Carrick, grandson of that Bruce, lord of Annandale, who had been Baliol's rival in the dispute concerning the Scottish crown. He had long been an unwilling and restless retainer of Edward, but latterly determined to push his claims in Scotland, and was crowned as king of the country at Scone in 1306. At first his career was not successful, but the death of Edward I. at Burgh-on-Sands, on his way to Scotland, and the inactivity of his son Edward II., were turning-points in the recovery of the independence of Scotland. Gradually Bruce recovered the whole country, till in 1313 the only English garrison left was Stirling Castle, which was closely besieged by the Scotch. To relieve it Edward II. led into Scotland a great army, which was totally defeated by Bruce in the battle of Bannockburn (24th June, 1314). After this victory Bruce reigned with almost uninterrupted success, and died in 1329.

On the death of Robert Bruce his son, David II., a boy six years old, was proclaimed king, and acknowledged by the great part of the nation. Edward Baliol, however, the son of John Baliol (who died 1314) formed a party for the purpose of supporting his pretensions to the crown; he was backed by Edward III. of England. At first Baliol was successful; and on the 24th September, 1332, he was crowned king at Scone, but eventually David succeeded in driving him from the kingdom. Still, however, the war was carried on with England with increased rancour till at length David was made prisoner at the battle of Neville's Cross, near Durham (7th October, 1346). After being detained in captivity for eleven years he was ransomed for 100,000 merks.

At his death in 1370, childless, the succession fell to Robert, son of Walter, the high steward, and of Marjory Bruce, daughter of Robert I. (Bruce), Robert II. being thus the first of the Steward, or, as it came to be written, Stewart or Stuart, dynasty. He concluded a treaty with France, in which the nations mutually stipulated to assist and defend each other. His reign was on the whole peaceful, though the usual border raids between Scotland and England continued: the chief ending in the celebrated fight of Otterbourne or Chevy Chase. Robert II. died in 1390, and was succeeded by his son, John, who upon his accession took the name of Robert III. Scotland at this time was rent by the dissensions of its powerful barons and the feuds of hostile clans, and Robert was of too weak and indolent a character to cope with the turbulent spirits of the age. An invasion of Henry IV. in 1400 effected nothing. In 1402 the Scots sent an army under Douglas to make reprisals on Eng-

SCOTLAND
BY J. BARTHOLOMEW F.R.G.S.
ATLANTIC OCEAN
ORKNEY AND SHETLAND
ORKNEY
SHETLAND
NORTH SEA
IRISH SEA
CAITHNESS
SUTHERLAND
ROSS AND CROMARTY
INVERNESS
NAIRN
MORAY
BANFF
ABERDEEN
KINCARDINE
FORFAR
PERTH
ARGYLL
BUTE
DUMBARTON
STIRLING
LINLITHGOW
EDINBURGH
HADDINGTON
BERWICK
ROXBURGH
SELKIRK
PEEBLES
LANARK
AYR
WIGTOWN
KIRKCUDBRIGHT
DUMFRIES
NORTHUMBERLAND
CUMBERLAND
Cape Wrath
Butt of Lewis
Outer Hebrides or Western Isles
Minch
Little Minch
North Uist
South Uist
Benbecula
Barra
Canna
Rum
Eigg
Skye
Ardnamurchan Pt.
Coll
Tiree
Iona
Colonsay
Islay
Jura
Mull
Oban
Staffa
Gigha
Arran
Ailsa Craig
Mull of Kintyre
Rathlin I.
Lough Foyle
Londonderry
Lough Swilly
Belfast
Belfast Lough
Port Patrick
Burrow Hd
Solway Firth
Carlisle
Firth of Clyde
Firth of Forth
Firth of Tay
Moray Firth
Pentland Firth
Dunnet Hd
Duncansby Hd
Wick
Thurso
Tarbat Ness
Inverness
Fort George
Nairn
Elgin
Banff
Peterhead
Aberdeen
Stonehaven
Montrose
Arbroath
Dundee
Perth
St Andrews
Fife Ness
Dunbar
St Abbs Hd
Berwick
Greenlaw
Jedburgh
Hawick
Selkirk
Peebles
Lanark
Hamilton
Glasgow
Paisley
Greenock
Dumbarton
Stirling
Falkirk
Linlithgow
Edinburgh
Haddington
Dunbar
Ayr
Girvan
Stranraer
Portpatrick
Wigtown
Kirkcudbright
Dumfries
Annan
Gretna
Lochmaben
Moffat
Langholm
Lochmaddy
Stornoway
Ullapool
Gairloch
Portree
Broadford
Kyle of Lochalsh
Fort William
Ballachulish
Oban
Inveraray
Campbeltown
Rothesay
Largs
Ardrossan
Troon
Girvan
Ailsa Craig
Mull of Galloway
Burrow Hd
Isle of Man
Douglas
Peel
Ramsey
Castletown
Whitehaven
Workington
Maryport
Cockermouth
Keswick
Penrith
Appleby
Brough
Kirkby Stephen
Barnard Castle
Darlington
Stockton
Middlesbrough
Whitby
Scarborough
Bridlington
Hull
Grimsby
Lincoln
Boston
Wash
Norfolk
Suffolk
Essex
Kent
Dover
Calais
Boulogne
Dunkirk
Ostend
Flushing
Rotterdam
Amsterdam
Helgoland
Heligoland Bight
Texel
Vlieland
Terschelling
Ameland
Schiermonnikoog
Borkum
Norderney
Juist
Baltrum
Langeoog
Spiekeroog
Wangerooge
Jade
Weser
Elbe
Cuxhaven
Hamburg
Bremen
Oldenburg
Emden
Leer
Papenburg
Meppel
Zwolle
Kampen
Deventer
Arnhem
Nijmegen
Utrecht
Amersfoort
Hilversum
Haarlem
Leiden
The Hague
Delft
Rotterdam
Dordrecht
Gorinchem
Tiel
Arnhem
Zutphen
Apeldoorn
Harderwijk
Elburg
Enkhuizen
Hoorn
Alkmaar
Den Helder
Texel
Vlieland
Terschelling
Ameland
Schiermonnikoog
Borkum
Norderney
Juist
Baltrum
Langeoog
Spiekeroog
Wangerooge
Jade
Weser
Elbe
Cuxhaven
Hamburg
Bremen
Oldenburg
Emden
Leer
Papenburg
Meppel
Zwolle
Kampen
Deventer
Arnhem
Nijmegen
Utrecht
Amersfoort
Hilversum
Haarlem
Leiden
The Hague
Delft
Rotterdam
Dordrecht
Gorinchem
Tiel
Arnhem
Zutphen
Apeldoorn
Harderwijk
Elburg
Enkhuizen
Hoorn
Alkmaar
Den Helder

land, but they were met by the English under Percy at Homildon Hill and completely routed. The latter part of the reign of Robert III. was disturbed by the ambition of his brother, the Duke of Albany, who is said to have caused the death of the profligate young Duke of Rothesay, the heir to the throne. Afraid for the safety of his second son, James, Robert designed to send him to France; but the ship in which he was being conveyed was captured by the English, a misfortune which hastened the king's death (1406).

James I. being then only eleven years of age, and a captive, the regency devolved on the Duke of Albany. The kingdom was torn with internal strife. Several of the more powerful nobles were conciliated by grants of land; but Donald, lord of the Isles, the most powerful Highland chief, marched into Aberdeenshire with a great host, and threatened to overrun lowland Scotland. He was totally defeated at Harlaw by a much inferior force (24th July, 1411), and the country was saved from this danger. The excellent education bestowed on James in England in some measure compensated for the injustice of his capture and detention. In England also he obtained a wife, namely Joanna Beaufort, daughter of the Earl of Somerset and niece of King Henry V. Their marriage facilitated the negotiations for his release, and after nineteen years of captivity he and his bride were crowned at Scone (1423). On his return the regent Murdoch of Albany was put to death, reforms in the constitution of parliament and in the statute-law effected, lawlessness put down, and the connection between Scotland and France strengthened. James's efforts to diminish the power of the great nobles provoked a conspiracy against him, and he was murdered in the Blackfriars' Monastery at Perth (20th February, 1437). In this reign the University of St. Andrews was founded (1411).

His son and successor James II. being only seven years of age, the country was subjected to the miseries of a long and feeble regency. One of the chief events of his reign was the rebellion and temporary overthrow of the powerful house of Douglas. James was accidentally killed by the bursting of a cannon at the siege of Roxburgh Castle (3d August, 1460). James III. was not quite eight years of age when he succeeded to the kingdom, which was again subject to all the troubles of a minority. In 1467 the young king married Margaret, daughter of the Norse king Christian, and in the shape of a pledge of payment of her dowry the Orkney and Shetland Islands were given up to Scotland, of which they have ever since formed a part. James seems to have been a man of culture, but weak of will and partial to favourites. A confederation against him was formed by a number of his nobles in 1488; the forces met at Sauchieburn, near Stirling, where the royal army was defeated, and James was murdered in the flight.

James IV., who had been induced to join the nobles hostile to his father, was sixteen years old when he ascended the throne. In 1503 he married Margaret, daughter of Henry VII. of England, and thus paved the way for the future union of the two kingdoms. During the early part of the reign of Henry VIII. James was induced to espouse the French cause and to invade England. This disastrous campaign ended in the total destruction of his splendid army, his own death and that of most of the nobles who accompanied him, at Flodden Field (9th Sept. 1513).

The king's death plunged the nation into a state of anarchy; his infant successor James V. had not yet reached the age of two years. His cousin, the Duke of Albany, was appointed regent, but from an early part of the reign James was almost entirely in the hands of the Earl of Angus, who had married the queen dowager, and had almost complete control of affairs till 1528, when James then in his seventeenth year managed to escape to Stirling, take the government in his own hands, and drive Angus into England. His alliance was sought by England, France, and Spain, and in 1537 James married Madeleine, daughter of Francis I. The young queen died a few weeks after her arrival in Scotland, and in the following year James married Mary of Lorraine, daughter of the Duke of Guise. Henry VIII. made several attempts to induce James to throw off allegiance to Rome in vain. A conference was proposed at York. James failed to attend, and Henry at once declared war. The Scottish king assembled his whole army, but had to disband it owing to the discontent of his nobles. Another force was despatched to England by the western border, but an obnoxious favourite of James being in chief command, the troops refused to obey, and a small English force taking advantage of the disorder, the total defeat

of Solway Moss was the result. A few days afterwards James died at Caerlaverock Castle (14th Dec., 1542), having just received tidings of the birth of his daughter, the future Mary Queen of Scots. In many ways James consulted the good of his subjects, but his continued efforts to depress the nobility embroiled him with that powerful body. He was popular with the people as a whole, and strictly administered justice. He was a supporter of the old faith as against the reformed doctrines.

The eventful period which followed the accession of Mary was dominated by the Reformation movement, and the questions affecting the Union of Scotland and England. A scheme to affiance the young queen to Edward, son of Henry VIII., was defeated by a party of the nobles getting possession of the queen, and renewing the old league with France. The consequence was war with England, when the whole of the south-east of the country was devastated, and the Scottish army defeated at Pinkie (1547). In the following year Mary was sent to France, her mother filling the regency. In 1558 she was married to the dauphin who succeeded to the throne the following year, but died in 1560. Mary then returned to Scotland, where she found the nobility divided into two parties, the Roman Catholics headed by Huntly, and the Reformed party headed by her half-brother, Lord James Stewart, afterwards Earl of Moray or Murray. At first she was disposed to conciliate the reformers on condition she was allowed the exercise of her own faith. This was agreed to by Moray, who was practically prime-minister, and the moderate section of the reformers, but did not satisfy the extreme section headed by Knox. The chief military incidents of her early reign are a raid headed by Moray against the turbulent and plundering borderers, in which many of them were slain in fight and others executed; and the suppression of the revolt of the Catholic Earl of Huntly, the most powerful chief of the north. Huntly himself fell in battle in 1562 at Corrichie, about 16 miles west of Aberdeen, his son was arrested and executed, and the power of the house was broken. In spite of Knox's party, Mary's reign was popular up till her unfortunate marriage with Darnley in 1565. Moray, who opposed the marriage, had to fly, and was henceforward her enemy. The marriage was unhappy. Darnley was murdered by the Earl of Bothwell and his servants, but whether Mary was accessory to the murder is yet a matter of controversy. The fact remains that she married Bothwell within three months, and alienated the greater number of her subjects. A confederacy was formed against her, and after a vain show of resistance at Carberry Hill she surrendered, and was imprisoned in Lochleven Castle, where she was forced to abdicate in favour of her infant son, and commit the regency to Moray (1567). In May next year she escaped, and raised an army, which was met by Moray and the Protestant nobles at Langside, near Glasgow, and was defeated. Flying to England Mary put herself under the protection of Elizabeth. Here she drops from Scottish history, but her after-life till her execution in 1587 was a continual series of plots to regain her lost throne.

James VI., the son of Mary, being a mere child, Moray held the regency of the kingdom, conducting its affairs with a wise and firm hand, till the 26th February, 1570, when he was shot in the streets of Linlithgow by Hamilton of Bothwellhaugh. His death was followed by a succession of regents—Lennox, Mar, and Morton—by great disorders in the kingdom, and a war between the parties of the king and queen. Morton was executed in 1581, and the other chief events of the reign, prior to the union of the crowns by the accession of James to the throne of England as James I., were the raid of Ruthven, the marriage of James to Ann of Denmark, and the Gowrie conspiracy. On the death of Elizabeth in 1603, James succeeded as the nearest heir through his descent from Margaret, daughter of Henry VII. and wife of James IV. He was crowned at Westminster, and assumed the title of King of Great Britain, France, and Ireland.

There were seven Scottish Parliaments called by James after his accession, wherein he was represented by a commissioner sitting as president. His chief energies were directed to an attempt to draw England and Scotland into a closer union by means of harmonizing the laws of the two countries, and by establishing episcopacy in Scotland. In furtherance of the latter object he visited Scotland in 1617 for the only time after the union of the crowns. There were many acts passed for promoting trade and commerce, and the nation about this time seems to have been seized with a mania for coloni-

zation, as many thousands of the inhabitants left their native land for the Irish province of Ulster, or the more distant shores of Nova Scotia. James VI. died in 1625, and was succeeded by his son, Charles I., then in the twenty-fifth year of his age.

Foreign wars and domestic troubles prevented Charles from visiting Scotland till 1633 when he was crowned at Edinburgh. The church was now entirely governed by the bishops, and civil affairs managed by the privy-council. At the outbreak of the civil war in England, Scotland took the part of the parliament against the king, the Solemn League and Covenant being entered into between the Scottish Presbyterians and the English parliament (1643). A Scottish army entered England under Alexander Leslie, earl of Leven, and was of considerable assistance to the parliamentary forces at Marston Moor and elsewhere. Meanwhile Montrose overran the country with his wild Highland and Irish army, till his career was cut short by General David Leslie at Philiphaugh in 1645. The affairs of the king becoming hopeless in England, Charles gave himself up to the Scottish army posted before Newark 5th May, 1646, and was surrendered to the English parliament 30th January, 1647, on payment of the arrears of pay of the Scottish troops.

After the execution of Charles (30th Jan., 1649) the Scots proclaimed his son king, under the title of Charles II. The young king was then in Holland, and certain commissioners were sent over from Scotland to inform him that the governing body were willing to espouse his cause if he should take the Covenant with its companion testimonies, and engage to do his utmost to enforce the whole Covenanting system over England and Ireland. This Charles agreed to do, and he was invited over to his northern kingdom. He arrived in Scotland, landing at the mouth of the Spey, 3d July, 1650, and marched southward by Aberdeen, Dundee, and St. Andrews to Falkland Palace. This royal progress alarmed the republican council of state at Whitehall, and a force under Cromwell was despatched to stop it. General David Leslie marched to meet Cromwell, but was defeated at Dunbar (3d September, 1650). Notwithstanding this defeat, Charles was crowned at Scone (1st January, 1651), and immediately marched into England. Cromwell followed, and at Worcester utterly scattered the royalist force, and compelled Charles to become a fugitive (3d September, 1651). Cromwell returned to Scotland and so far reduced it, leaving Monk to complete the work. This was brought about by the sack of Dundee in 1653 and other severe measures. Cromwell's death was soon followed by the fall of his son, Monk's march to London at the head of the army, and the restoration of Charles II. (1660).

The Scottish parliament assembled under the Earl of Middleton, the king's commissioner, January 1, 1661, and it soon became apparent that Charles was determined to carry out the favourite scheme of his father and grandfather of establishing Episcopacy in Scotland. This endeavour to establish Episcopacy was violently opposed, and led to a cruel persecution, which lasted with more or less severity during the whole of the reign of Charles. Hundreds were executed on the scaffold, others were fined, imprisoned, and tortured; and whole tracts of the country were placed under a military despotism of the worst description. (See *Covenanters.*) In 1679 a body of royal troops under Graham of Claverhouse was defeated by a force of Covenanters at Drumclog. Six weeks later the Covenanters were defeated with terrible slaughter at Bothwell Bridge. Charles died in 1685, and was succeeded by his brother, James VII. of Scotland and II. of England. The chief events of his reign, so far as Scotland was concerned, were the rising, defeat, and execution of Argyle; the declarations of indulgence by which many of the Presbyterian ministers returned to their charges; and the continued persecution of the strict Covenanters, one of whose ministers, Renwick, the last of the Covenanting martyrs, was executed at Edinburgh in 1688.

At the Revolution a convention of the Estates at Edinburgh proclaimed William, prince of Orange, James's son-in-law and nephew, and his wife Mary, James's daughter, king and queen of Scotland. Claverhouse, now Viscount of Dundee, raised an army of Jacobites, but his death at Killiecrankie (1689) put an end to the rising. Religious freedom was again restored, and in 1690 a General Assembly of the Presbyterian church again met. The reign of William III. was marked by two events which rendered him generally unpopular in Scotland and strengthened the cause of the Jacobites, as the party who still adhered to James II. was called. We allude to the massacre of Glencoe (see *Glencoe, Massacre of*) and the unfortunate Darien expedition

(see *Darien Scheme*), but the reign closed without any serious rising in Scotland.

The death of William III. in 1702 transferred the crowns of the two nations to Queen Anne, sister of Mary. In 1703 the parliament of Scotland issued a declaration which intimated a purpose, in case of the demise of the crown, to appoint a different sovereign from the English king, and the ill-feeling between the two countries grew so strong that English statesmen became convinced that an incorporating union was essential for the peace of the two countries. A joint-commission was appointed to draw up articles of union in 1706. The Scottish parliament met to consider the articles, which encountered a strong opposition headed by the Duke of Hamilton, and strongly backed up by the bulk of the people. A majority of the parliament, however, carried the measure (16th January, 1707); it received the royal assent (March 4); and the Union took effect (May 1). The chief provisions of the Act of Union were (1) That the two kingdoms should be united under the name of 'Great Britain;' (2) that the succession to the crown of the United Kingdom should be in the Electress Sophia of Hanover and her heirs, being Protestants; (3) that 16 Scottish peers and 45 Scottish members of the House of Commons should be elected to the one parliament sitting in London; (4) that the Established Presbyterian Church of Scotland should be maintained: (5) that Scotland should keep unchanged her own laws and customs relating to property and private rights, and also the Court of Session and other Scotch courts; (6) that all the rights of trade, free intercourse, and citizenship should be the same for Scotch and English subjects. Henceforth the general history of Scotland may be said to be entirely identified with that of England. See *Britain*.

Ecclesiastical History.—The religion of Celtic Scotland was Druidism (see *Druids*), the priesthood of which seem to have exercised much authority over both chiefs and people, but little is known of their tenets. Towards the end of the Roman occupation Christianity is said to have been introduced among the Southern Picts by St. Ninian, but it seems that they were still in a state of paganism when Columba introduced Christianity north of the Forth in the 6th century. St. Cuthbert was the apostle of the south-east, and St. Kentigern of Strathclyde. In the 7th and 8th centuries the native church of Scotland came into collision with the church of Rome on the question of Easter, &c., and during this time the so-called Culdees (which see) are first heard of. It was not till the 13th century that the church became completely assimilated to the Western church in the rest of Europe. The ritual of the mediæval church in Scotland was almost identical with that of the church in England, and the external system of the church—cathedral, parochial, and monastic—was also essentially the same. Monasteries existed as in England, the monastic orders represented being the Benedictines, Dominicans, Franciscans, &c. There were twelve dioceses (thirteen when Orkney was included), but down to the 15th century there was no archiepiscopal or metropolitan diocese in Scotland, though St. Andrews, and next to it Glasgow, had a certain precedence among the others. In consequence of this the archbishops of York often claimed metropolitan jurisdiction in Scotland. In 1472 St. Andrews was erected into the metropolitan see by a bull of Pope Sixtus IV., and all the Scottish bishops were made suffragans of St. Andrews. Twenty years later Glasgow was also made a bishopric, and hence broils arose between the two sees. For a lengthened period more than half the wealth of the nation was possessed by the clergy, and the bishops and abbots rivalled the first nobles in magnificence.

In the 16th century the corruption and abuses of the church, combined with a purely secular movement of all classes of the community against the rapacity of the clergy, helped greatly to further the spread of Protestant doctrines in Scotland, for preaching which Patrick Hamilton, George Wishart, and several others suffered at the stake. The accession of Elizabeth, and the return of John Knox from Geneva, greatly encouraged the reforming party, and in 1557 a great many of the chief reformers banded themselves together to co-operate for the interests of the reformed faith, and signed what is known as the First Covenant. The party of the reformers was so successful that in 1560 the Scottish parliament adopted the Confession of Faith drawn up by John Knox, the jurisdiction of the pope was abolished, and Calvinistic Protestantism was established as the national religion. (See *Reformation*.) The battle, however, was not yet over; Mary's influence caused a partial Catholic reaction; and the proposal of the Book of Discipline to devote the tithes to the

support of the clergy and the poor, and the revenues of the bishops and religious houses to the endowment of colleges and schools, met with considerable opposition from the laity, as did also the generally severe disciplinary measures proposed in the same book. The deposition of Mary, and the adherence of the regent Moray, however, strengthened the hands of the reformers. In this early period the church made use of a liturgy. After the death of Knox the conflict between Presbyterianism and Episcopacy began. The latter was favoured by the regent Morton, and for a time both systems coexisted. In 1578 when James VI. assumed the government a second Book of Discipline (still the law of the church) was drawn up, and in 1580 Episcopacy was abolished by act of parliament, and the National Covenant was made the test of orthodoxy. The chief governing power in the church was intrusted to a General Assembly, which met twice a year for twenty years, after which the meetings were annual; this body was composed of officials called superintendents, ministers, and lay commissioners. What has been considered the most essential characteristic of presbyterian government—the presbytery—was not yet introduced in its present form; but this took place before 1592, when the privileges of general and provincial assemblies, presbyteries, and parochial sessions were ratified by parliament. On the accession of James to the throne of England his energies were devoted to the establishment of Episcopacy; he succeeded in erecting seventeen sees, and in 1618 the 'Five Articles' of Perth became law. (See *Perth, Five Articles of.*)

The measures of his son Charles I. were equally unfavourable to the Scottish Church. On his attempting to introduce a liturgy the National Covenant was recast, and gladly subscribed by thousands of all ranks. An act of the General Assembly held at Glasgow in 1638 abolished the Five Articles of Perth, and Presbyterianism once more superseded Episcopacy. The Solemn League and Covenant of the three kingdoms, after having been approved of by the General Assembly of Scotland, was signed by the General Assembly of Divines at Westminster (which met in 1643) and by the parliament itself. The Westminster Assembly drew up a confession of faith (completed in 1646) which was accepted by the Church of Scotland, ratified by the Scottish parliament, and still is the recognized standard of the Presbyterian churches. The ascendency of the Independents put an end to the triumph of Presbyterianism, and the General Assembly, dissolved by Cromwell in 1653, did not sit again for thirty-five years. On the restoration of Charles II. Episcopacy was again established in Scotland, and about 400 ministers resigned their livings. During the following years occurred the great persecution of the Covenanters. (See *Covenanters*, also *Civil History* above.) After the revolution of 1688 the General Assembly again met; the Westminster Confession of Faith was ratified and the right of patrons to nominate to benefices was withdrawn. At the union of England and Scotland in 1707, a special statute was passed which secured the presbyterian form of church government in the latter country. In the year 1712 an act was passed by parliament which restored to patrons their right of presentation to church livings. This statute created much discontent, and led to the secession of various bodies from the Established Church, the first of which (1733) was the communion headed by Ebenezer Erskine, which took the name of Associate Synod. (See *United Presbyterians.*) This was followed in 1761 by another secession, the separating body taking the name of the Synod of Relief; and last and most important of all by the disruption of 1843, when the Established Church lost about half her ministers and members. (See *Free Church of Scotland.*) This obnoxious patronage act was modified by 6 and 7 Victoria, cap. lxi. (Lord Aberdeen's Act), and at last in 1874 was finally abolished.

The Church of Scotland has now 1363 parishes, 387 unendowed churches, preaching and mission stations, and over 626,000 communicants. The income of the church is derived (1) from the teinds, a charge on that portion of the estates of the laity which is burdened with an assessment for the payment of the stipends of the Established Church ministers (see *Teinds*): (2) a sum of £17,040 paid by the exchequer from church property in the hands of the crown to a number of poor parishes and Highland churches, in addition to an annual gift of £2000 given by the queen (who presides by a commissioner at the annual meeting of the General Assembly) to the Highland churches which have been weak since the time of the Disruption: (3) from private endowments, seat-rents, and the liberality of the members. The total collections for the

general purposes of the church since 1872, exclusive of the Baird gift of £500,000, have considerably exceeded £6,000,000. Since the passing of the abolition of patronage act the church has increased in general popularity, while a spirit of increased liberality has conduced much to its prosperity. An agitation on the part of a section of the Voluntary churches, for the disestablishment and disendowment of the church has been alive for some years. See *Assembly* (*General*), *Kirk-session*, *Patronage*, *Presbyterians*, and *Synod*.

Language and Literature.—Down to the 15th century the term Scottish language meant the Gaelic or Celtic tongue; the language of lowland Scotland being looked upon as English, which indeed it was and is—Northern English, with certain peculiarities of its own. The term Scottish came to be applied to it as possessing these peculiarities, and as having a somewhat distinctive literary use. This language has been divided into three periods. During the *early* period, extending to near the end of the 15th century, there was little difference between the language of Scotland and that of England north of the Humber. In the *middle* period, which extended to the Union, it was influenced in a slight degree by the Gaelic, and in a more pronounced manner by French and Latin, consequent on the French alliance and the revival of learning. During the modern period the language, as used in popular poetry, &c., has been to a considerable extent affected by modern literary English, though the genuine vernacular may still be heard in many districts with dialectic peculiarities according to locality.

The Sir Tristrem, a metrical romance, doubtfully attributed to Thomas the Rhymer, is by some regarded as the earliest piece of Scottish literature, and is generally accounted the earliest specimen of romance poetry in Britain (end of the 13th century). But the first undoubted specimen of Scottish literature is the Bruce of Barbour (about 1375; see *Barbour*). Between 1420 and 1424 was written Wyntoun's Oryginale Cronykil of Scotland, and about 1460 Henry the Minstrel, commonly called Blind Harry, did for Wallace what Barbour had done for Bruce. Another of the poets of this early period is no less a personage than James I. (1394–1437), author of the King's Quhair. Christis Kirk of the Grene and Peblis to the Play, long believed to have been productions of James, have to be attributed to some other early poet. Down to the middle of the 16th century four names stand out prominently, viz., Henryson, Dunbar, Gavin Douglas, and Sir David Lyndsay (which see). Minor poets of this period were Walter Kennedy, Sir John Rowll, Quintin Shaw, and Patrick Johnstone. In 1536 John Bellenden, archdeacon of Moray, published the Hystory and Croniklis of Scotland, a translation of Boece's Historia gentis Scotorum, which was also versified by William Stewart, a descendant of the first earl of Buchan. The anonymous Complaynt of Scotland (1548) is of value as preserving the titles of several popular pieces of contemporary literature now lost, and as a piece of early prose. The poems of Sir Richard Maitland (1560) are curious, but his title to remembrance, as well as that of George Bannatyne (1568), rests on their extensive MS. collections of Scottish poetry, the one preserved in the Pepysian Library at Cambridge, the other in the Advocates' Library, Edinburgh. (See *Maitland Club*, *Bannatyne Club*.) With the exceptions of Alexander Scott, Arbuthnot, Rolland of Dalkeith, Alex. Montgomery, Sir William Alexander, and Drummond of Hawthornden, about a century and a half now elapses before we come upon the name of any eminent Scottish poet; most of the scholars of that period, such as Major and Buchanan, addressed themselves to the world at large and wrote in Latin. We have, however, vernacular prose works of merit in Lyndsay of Pitscottie's Chronicle, and Knox's History of the Reformation. In the third period of the language, when it had become a provincial patois, the first notable name is that of Allan Ramsay (1686–1758), author of The Gentle Shepherd, and of numerous shorter pieces and songs. To this same age belongs also nearly the whole of that remarkable body of song known as the Jacobite minstrelsy. The Scottish ballads, ever since the publication of Percy's Reliques, have engaged much attention, and have been carefully collected and illustrated by Sir Walter Scott and other editors. The list of the more prominent successors of Ramsay is closed by the names of Fergusson, Burns, Hector Macneil, Scott, James Hogg, and Tannahill; while the vernacular prose writers may be said to be represented by John Galt, Hogg, Sir Walter Scott, George MacDonald, and others. For the Scotchmen who have won an honourable place in English literature see *England*, section Literature.

Scots Greys, ROYAL, now the 2D DRAGOONS, a celebrated British regiment first raised in Scotland for the service of Charles II., Nov. 15, 1681. It was the first regiment of British dragoons, and was originally called the Royal Regiment of Dragoons of Great Britain. They derive the name of Scots Greys from the grey chargers on which they used to be mounted. The Scots Greys bear on their colours the thistle within the circle and motto of St. Andrew, an eagle, the motto 'Second to None,' and the names of Blenheim, Ramillies, Oudenarde, Malplaquet, Dettingen, Waterloo, Balaklava, and Sevastopol. Their uniform is scarlet, with blue facings and a white plume.

Scott, DAVID, historical painter, born at Edinburgh in 1806, died 1849. His father was a landscape engraver. Scott, however, had early determined to become a painter, and in 1828 he exhibited his first picture, The Hopes of Early Genius Dispelled by Death. In 1832 he visited London, Paris, and Geneva, most of the art cities of Italy, and finally reached Rome, where he studied during two years and painted several original works, among which was one of his greatest efforts, The Household Gods Destroyed. Having returned to Edinburgh he continued the practice of his art, and became a regular contributor to the exhibitions of the Scottish Academy. Among his chief pictures are: Vasco de Gama Encountering the Spirit of the Storm at the Cape; Queen Elizabeth at the Globe Theatre viewing the performance of the Merry Wives; Paracelsus lecturing to his Students on the Elixir of Life; The Duke of Gloucester carried to Prison (Scott's finest work); Ariel and Caliban; A Vintager; Peter the Hermit Preaching the First Crusade; Orestes and the Furies, &c.; besides designs in outline for the Ancient Mariner, the Pilgrim's Progress, &c. While the works of Scott display much originality, with expressive rather than accurate drawing, they are generally imperfect in execution and defective in colour.

Scott, SIR GEORGE GILBERT, R.A., architect, grandson of Thomas Scott, the biblical commentator, was born at Gawcott, near Buckingham, in 1811; died 1878. His tastes drew him mainly to the study of Gothic architecture, and to him is due in a great measure its revival in Great Britain. He was very largely employed in the erection of new churches, colleges, and secular public buildings, among which may be mentioned the church of St. Nicholas at Hamburg, the first important specimen of the Gothic revival erected in Germany, and the spire of which is 478 feet high; the Foreign Office, the India Office, and the Home and Colonial Offices, London; Glasgow University; the Memorial to the Prince Consort, London; and St. Mary's Cathedral, Edinburgh. Sir Gilbert was specially identified with the process termed 'restoration,' which he applied to many important minsters and churches, such as the cathedrals of Ely, Lichfield, Hereford, Ripon, Gloucester, Chester, St. David's, St. Asaph, Bangor, Salisbury, and St. Albans. In this connection he wrote a Plea for the Faithful Restoration of our Ancient Churches (1850); Conservation of Ancient Architectural Monuments (1864), &c. He was elected A.R.A. in 1852, and R.A. in 1860, and was knighted in 1872.

Scott, SIR MICHAEL, a Scottish philosopher and reputed magician of the 13th century, of whose history nothing is certainly known, except that after his return from the Continent he received the honour of knighthood from Alexander III., by whom he was confidentially employed, and that he died at an advanced age in 1291. He must have been a man of considerable learning for his time, and being addicted to the study of the occult sciences passed among his contemporaries for a magician, and as such is mentioned by Boccaccio and Dante. He is generally identified with a Sir Michael Scott, or Scot, of Balweary, in Fifeshire, but this is at least open to doubt.

Scott, MICHAEL, author of Tom Cringle's Log and The Cruise of the Midge, was born at Glasgow, 1789, and was educated at the high-school and university of his native city; resided in Jamaica, engaged in commerce and agriculture, 1806–22; and finally settled in Scotland, and embarked in commercial affairs. He died in 1835. The two brilliant sea-novels of which he was the author appeared anonymously in Blackwood's Magazine.

Scott, THOMAS, D.D., English biblical commentator, born in 1747. He was ordained in 1773; in 1781 he became curate of Olney; in 1785 he obtained the chaplainship of the Lock Chapel, near Hydepark Corner, London; and in 1801 he was appointed rector of Aston Sanford, in Buckinghamshire, where he died in 1821. He imbibed Calvinistic views, in the defence of which, both from the pulpit and the press, he greatly distinguished himself; but he is now remembered

chiefly by his Commentary, or Family Bible with Notes, which has had a very large sale both in England and America.

Scott, Sir Walter, Bart., poet and novelist, was born in Edinburgh, August 15, 1771. He was a younger son of Walter Scott, writer to the signet, by Anne, daughter of Dr. John Rutherford, professor of medicine in the University of Edinburgh,

Sir Walter Scott.

both connected with old Border families. Before he was two years old his right leg was attacked with a weakness, which left him lame for life, and generally as a boy his health was not robust. He entered the high-school of Edinburgh in 1779, and in October 1783 he was matriculated at the University of Edinburgh, where he studied Latin under Professor Hill, Greek under Professor Dalzell, and logic under Professor Bruce; but neither at school nor at college did he manifest any special brilliance. He was not idle, however, being a voracious reader from his earliest years, especially in the fields of ballad literature, romance, and history, and he acquired a fair acquaintance with modern languages, French, Italian, and Spanish, and even with German, a knowledge which was in that day not common. At the age of sixteen he commenced in his father's office an apprenticeship to legal business, and in 1792 he was admitted a member of the Scottish bar (the Faculty of Advocates). In 1797 he married a Miss Charpentier, the daughter of a French refugee; in 1799 he was appointed sheriff of Selkirkshire, a situation to which an income of £300 was attached; and in 1806 he became a principal clerk of the Court of Session, although by arrangement with his predecessor he did not receive the full emoluments of his office, about £1200, till the death of the latter in 1812. His first ventures in literature were a translation of Bürger's Lenore, and Der wilde Jäger (The Wild Huntsman), which he published in a small quarto volume in 1796; then followed the ballads of Glenfinlas, The Eve of St. John, and the Gray Brother; a translation of Goethe's Goetz von Berlichingen in 1799; the Minstrelsy of the Scottish Border in 1802–3 (3 vols.); and an edition of the old metrical romance of Sir Tristrem in 1804. In 1805 he became prominent as an original poet with the Lay of the Last Minstrel, an extended specimen of the ballad style, which fell upon the public as something entirely new, and at once became widely popular. In 1808 he published Marmion, another poetic romance which greatly increased his reputation; and in 1810 the Lady of the Lake, in which his poetical genius seems to have reached the acme of its powers. His subsequent poetical productions — The Vision of Don Roderick (1811), Rokeby (1812), The Bridal of Triermain (1813), The Lord of the Isles (1815), Harold the Dauntless (1817), Halidon Hill (1822), The Auchindrane Tragedy (1830), The Doom of Devorgoil (1830)—did not attain the same success. On the decline of his popularity as a poet he turned his attention to the prose romance, for which the greater part of his early life had been a conscious or unconscious preparation. The appearance of Waverley, in 1814, forms an epoch in modern literature as well as in the life of Scott. This romance or novel was rapidly followed by numerous others, forming, from the name of the first, the series known as The Waverley Novels. The earlier of these were Guy Mannering (1815), The Antiquary, The Black Dwarf, Old Mortality (1816), Rob Roy (1817), The Heart of Midlothian (1818), The Bride of Lammermoor, A Legend of Montrose, and Ivanhoe (1819). These splendid works of fiction which surprised and enchanted the world, it is held by most, mark the high tide of his genius, those which follow being placed on a somewhat lower level, although there are several, especially in the second period, up to 1825, in which no falling-off is perceptible. Ivanhoe was followed by The Monastery, The Abbot (1820), Kenilworth, The Pirate (1821), The Fortunes of Nigel, Peveril of the Peak (1822),

Quentin Durward, St. Ronan's Well (1823), Redgauntlet (1824), The Betrothed and The Talisman (1825), Woodstock (1826), The Chronicles of the Canongate, The Fair Maid of Perth (1829), Anne of Geierstein (1829), Count Robert of Paris and Castle Dangerous (1831). The Waverley novels were all published anonymously, nor did Scott cease to be the 'Great Unknown' until 1827, although their authorship had long been an open secret to many. Meanwhile he performed an amount of miscellaneous literary work which would have been almost more than enough for any other man, and the mere enumeration of which would be tedious; he also attended to the duties of his offices as sheriff of Selkirkshire, and a clerk of the Court of Session. The desire of becoming an extensive landed proprietor, and of founding a family, was a passion which apparently glowed more warmly in his bosom than even the appetite for literary fame. This desire he began to gratify in 1811, when he purchased a small farm of about 100 acres, lying on the south bank of the Tweed, 3 miles above Melrose, upon which was a small and inconvenient farm-house. Such was the nucleus of the mansion and estate of Abbotsford. By degrees, as his resources increased, he added farm after farm to his domain, and reared his chateau turret after turret, till he had completed what a French tourist not unaptly terms 'a romance in stone and lime;' clothing meanwhile the hills behind, and embowering the lawns before, with flourishing woods of his own planting. It was here that he dispensed for a few years a splendid hospitality to the numerous visitors whom his fame drew from every part of the civilized world. In 1820, when he was made a baronet by George IV., who was a great admirer of his genius, he reached the zenith of his fame and outward prosperity. But this prosperity was founded on no solid basis, and the crash came in 1826, when Constable & Co. the Edinburgh publishers were obliged to suspend payment, hopelessly involving Ballantyne & Co., with whom it then appeared Scott had been connected as a partner since 1805. The liabilities which were thus incurred by him amounted to £130,000. His humiliation was indescribable, but he met the trial with strength and dignity. Liberal offers of assistance were made to him, but he refused them all. 'Time and I against any two,' he said; and leaving Abbotsford and taking a lodging in Edinburgh, he worked like a galley-slave in order to clear off the debt. Within a few years he was able to pay his creditors £40,000, and to put things in such shape that soon after his death the whole debt was liquidated. Symptoms of gradual paralysis, a disease hereditary in his family, began to be manifested, and in the autumn of 1831 his physicians recommended a residence in Italy as a means of delaying the approaches of his illness. To this scheme he felt the strongest repugnance, as he feared he should die on a foreign soil; but by the intervention of friends he was prevailed upon to comply. He sailed in a government vessel from Portsmouth, landed at Naples, and afterwards proceeded to Rome, Tivoli, Albani, and Frascati. Feeling, however, that his strength was rapidly decaying, his desire to return to his native land became irrepressible, and he hurried home with a rapidity which in his state of health was highly injurious. He reached Abbotsford in July 1832, and died there 21st of September, 1832. He was interred in his family burial aisle amidst the ruins of Dryburgh Abbey. His life was written by his son-in-law, John Gibson Lockhart, a work which has taken the position of a classic.

Scott, William Bell, brother of David Scott, the painter, and himself a painter, etcher, engraver, archæologist, and poet, born at Edinburgh in 1811. He received his art training in Edinburgh, removed to London in 1836. In 1844 at the request of the Board of Trade he established a school of art at Newcastle-on-Tyne, and was until 1885 art examiner under the Education Board. His published poems include: Hades (1838), The Year of the World (1846), Poems by a Painter (1854), Ballads, &c. (1875), and Harvest Home (1882). Other works are: Antiquarian Gleanings; Lectures on Art; Albert Dürer, His Life and Works; The Little Masters; Life and Works of David Scott; &c. He died in 1890.

Scott, Winfield, commander-in-chief of the United States army, was the son of a Scottish Jacobite, and was born near Petersburg, Virginia, 1786; died at West Point, 1866. He was brought up to the law, and admitted to the bar, but never practised. Entering the army he served with distinction in the war of 1812–14, and afterwards visited Europe, and studied military science at Paris. In 1832 and the following years General Scott was employed in operations against the Indian tribes, and in 1841 he

was appointed commander-in-chief. His fame rests upon his brilliant conduct of the Mexican war of 1846–47, in which he gained several victories over Santa Anna, made himself master of Mexico, and concluded an advantageous peace. He was twice an unsuccessful candidate for the presidency. On the outbreak of the great civil war he remained true to the Federal government, but was too infirm to take any actual command. He retired from active service in 1861, and in 1864 he published his autobiography.

Scotus, DUNS. See *Duns.*

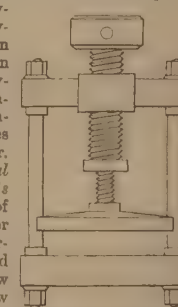
Scotus, JOHN. See *Erigena.*

Scranton, a city of the United States, capital of Lackawanna county, Pennsylvania, in a valley near the Lackawanna River, 150 miles W.N.W. of New York. It owes its rapid prosperity to the numerous collieries in the vicinity, to its large rolling-mills and steel works, and extensive manufactures of railway rolling-stock, machinery, edge-tools, leather, window sashes and blinds, silk fabrics, &c. The city was founded in 1840. Pop. 75,215.

Screamer, the name given to two genera of South American grallatorial or wading birds, the *Palamēdea cornūta* or horned screamer (which see) and the closely allied *Chauna chavaria* or crested screamer. The latter has no horn, but its head is furnished with a dependent crest of feathers.

Screen, in ecclesiastical architecture, is a partition of stone, wood, or metal to separate different parts of the building, as the nave or an aisle from the choir, or a private chapel from the transept. The term is also applied to a partition extending across the lower end of a mediæval hall, forming a lobby within the main entrance doors, and having often a gallery above; also to a decorated wall inclosing a courtyard in front of a building.

Screw, a wooden or metal cylinder having a spiral ridge (the thread) winding round it in a uniform manner, so that the successive turns are all exactly the same distance from each other, and a corresponding spiral groove is produced. The screw forms one of the six mechanical powers, and is simply a modification of the inclined plane. The energy is transmitted by means of a hollow cylinder (the female screw) of equal diameter with the solid one (the male screw), having a spiral channel cut on its inner surface so as to correspond exactly to the spiral ridge raised upon the solid cylinder. Hence the one will work within the other, and by turning the convex cylinder, while the other remains fixed, the former will pass through the latter, and will advance every revolution through a space equal to the distance between two contiguous turns of the thread. As the screw is a modification of the inclined plane it is not difficult to estimate the mechanical advantage obtained by it. If we suppose the power to be applied to the circumference of the screw, and to act in a direction at right angles to the radius of the cylinder, and parallel to the base of the inclined plane by which the screw is supposed to be formed, then the power will be to the resistance as the distance between two contiguous threads to the circumference of the cylinder. But as in practice the screw is combined with the lever, and the power applied to the extremity of the lever, the law becomes: The power is to the resistance as the distance between two contiguous threads to the circumference described by the power. Hence the mechanical effect of the screw is increased by lessening the distance between the threads or making them finer, or by lengthening the lever to which the power is applied. The law, however, is greatly modified by the friction, which is very great. The uses of the screw are various. It is an invaluable contrivance for fine adjustments such as are required in fine telescopes, microscopes, micrometers, &c. It is used for the application of great pressure as in the screw-jack and screw-press; as a borer in the gimlet; and in the ordinary screw-nail we have it employed for fastening separate pieces of material together. The *differential screw,* or *Hunter's screw,* is formed of two screws, a larger and a smaller, the former being screwed internally to allow the latter to screw into it; the pitch of the two screws differs slightly, and for each turn of the chief or larger screw the progress of the point of the compound screw is the difference of pitch. Great power is in this way attained without the weakness due to a screw with fine threads. See also *Screw-propeller, Archimedean Screw, Endless Screw.*



Hunter's Screw-press.

Screw-bean. See *Mesquite.*

Screw-pine (*Pandanus*), the type of an order of trees or bushes known as the Pandanaceæ or Screw-pine order. They are

Screw-pine (*Pandanus odoratissimus*).

natives of tropical regions, and abound in insular situations, such as the Eastern Archipelago. They branch in a dichotomous or forked manner, and are remarkable for the peculiar roots they send out from various parts of the stem. These roots are called aerial or adventitious, and serve to support the plant. The seeds are edible; and the flowers of some species are fragrant, as in the *Pandănus odoratissimus*, which is not uncommon in collections in Europe, and conspicuous by its adventitious roots, and its long spiny leaves, resembling those of the pine-apple, which are arranged in a screw-like manner.

Screw-propeller, an apparatus which, being fitted to ships and driven by steam, propels them through the water, and which, in all its various forms, is a modification of

Fig. 1.—Forms of Screw-propeller.

the common screw. Originally the thread had the form of a broad spiral plate, making one convolution round the spindle or shaft, but now it consists of several distinct blades, forming portions of two, three, or four threads, as illustrated by *a*, *b*, *c*, fig. 1, which give an idea of the various forms of blades for different sizes of propellers: *a* has a good shape for the larger sizes; *b*, having three blades, is successfully applied for twin screw steamers, and is also useful with two blades for medium sizes; *c* is suitable for small diameters and a moderate number of revolutions per minute. Either two or three blades of this shape answer well for barges and towing purposes. The usual position for the screw-propeller is immediately before the stern-post, as shown in fig. 2, the shaft passing parallel to the keel into the engine-room, where it is set in rapid motion by the steam-engines. This rotatory motion in the surrounding fluid, which may be considered to be in a partially inert condition, produces, according to the well-known principle of the screw, an onward motion of the vessel more or less rapid, according to the velocity of the shaft, the obliquity of the blades, and the weight of the vessel. In 1827 Mr. Wilson of Dunbar produced a screw-propeller which proved satisfactory, but the successful intro-

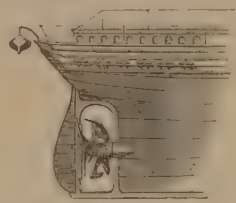


Fig. 2.—Screw-propeller in position.

duction of the screw-propeller is due to Mr. F. P. Smith and to Ericsson, who both independently and about the same time (1838) secured patents. Numerous modifications of the screw-propeller have been proposed and adopted since it was first introduced, and it has now practically superseded the paddle-wheel for sea-going vessels.

Scribe (skrēb), Augustin Eugène, French dramatic writer, born in Paris 1791, died 1861. His father was a silk merchant, and bequeathed to his son a considerable fortune. Young Scribe was originally intended for the legal profession, but at the age of twenty he abandoned it for the more congenial occupation of a writer for the stage. His first distinct success was achieved in 1816 with Une Nuit de Garde Nationale, and thenceforward

his pen was never idle. His dramatic pieces comprise all the departments of the lighter kind of drama, and from their gaiety and interest of plot, as well as the felicitous manner in which modern French life is depicted in them, have acquired a universal popularity over the European continent, and have also been introduced on the English and American stage in the form of translations or adaptations. Two of the best known among them, after the first successful one, are Le Verre d'Eau (Glass of Water) and Adrienne Lecouvreur. As an opera librettist Scribe is also deservedly famous, having supplied several composers, especially Auber and Meyerbeer, with the text of the most celebrated of their works. His works, frequently collaborations, number several hundreds. In 1838 he was admitted a member of the French Academy.

Scribes, among the Jews, were officers of the law. There were *civil* and *ecclesiastical* scribes. The former were employed about any kind of civil writings or records. The latter studied, transcribed, and explained the Holy Scriptures.

Scrip (abbreviation of *subscription*), a certificate of loans or shares in a joint-stock company, forming a temporary acknowledgment of the holder's interest, and indicating the amount and date of each instalment of the total subscribed or to be subscribed by him, the scrip being finally exchanged for a definite share certificate or bond.

Scriv'ener, FREDERICK HENRY AMBROSE, English biblical scholar, born in 1813; was educated at Trinity College, Cambridge, where he took the degree of M.A. in 1838. From 1846 till 1856 he was head-master of Falmouth School and incumbent of Penwerris, and he retained this living till in 1861 he was presented to the rectory of Gerrans, Cornwall. In 1870 he was appointed a member of the Company of Revision of the New Testament, and in 1872 he was granted a pension from the civil list in recognition of his services in connection with biblical criticism. In 1875 he became vicar of Hendon, Middlesex, and prebendary of Exeter. He died in 1891. He was a D.C.L. of Oxford. He took high rank in the philological criticism of the New Testament, on which he published some valuable works, beginning with an edition of the Greek text in 1860.

Scrof'ula, or SCROPHULA, a disease due to a deposit of tubercle in the glandular and bony tissues, and in reality a form of tuberculosis or consumption. It generally shows itself by hard tumours of the glands in various parts of the body, but particularly in the neck, behind the ears, and under the chin, which, after a time, suppurate, and degenerate into ulcers, from which, instead of pus, a white curdled matter is discharged. The first appearance of the disease is most usually between the third and seventh year of the patient's age; but it may arise at any period between this and the age of puberty; after which it seldom makes its first attack. It is by no means a contagious disease, but is of a hereditary nature, and is often entailed by parents on their children. It may, however, remain dormant through life, and not show itself till the next generation. The disease generally goes on for some years; and appearing at last to have exhausted itself, all the ulcers heal up, without being succeeded by any fresh swellings, but leaving behind them an ugly puckering of the skin, and a scar of considerable extent. This is the most mild form under which scrofula appears. In more virulent cases the eyes and eyelids are inflamed, the joints become affected, and caries of the bones supervenes. Hectic fever at last arises, under which the patient sinks; or the disease ends in tuberculated lungs and pulmonary consumption. Scrofula is also called *struma* and *king's-evil*.

Scroll, a very frequent ornament in architecture, consisting of a band arranged in undulations or convolutions. The name is also given to the volute of the Ionic and Corinthian columns.

Scrophularia'ceæ, a very large nat. order of herbaceous or shrubby monopetalous exogens, inhabiting all parts of the world except the coldest, containing about 160 genera and 1900 species. They have opposite or alternate entire toothed or cut leaves, and usually four or five lobed irregular flowers with didynamous stamens, placed in axillary or terminal racemes; with a two-celled ovary and albuminous seeds. Many of the genera, such as the foxglove, calceolaria, veronica, mimulus, antirrhinum, pentstemon, &c., are valued by gardeners for their beautiful flowers. *Scrophularia* is the typical genus. A decoction of *S. nodosa* is sometimes used by farmers to cure scab in swine.

Scruple, in Troy weight, is equivalent to 20 grains, $\frac{1}{3}$ part of a drachm, $\frac{1}{24}$ part of an ounce, and $\frac{1}{288}$ part of a pound.

Scrutin d'Arrondissement (skrü-tañ dà-rōŋ-dēs-mäŋ), in France, the system of voting

whereby each *arrondissement* or district of a department returns its own member for parliament, each voter of the *arrondissement* having only one vote. *Scrutin de Liste*, on the other hand, is the system of voting whereby all the candidates for a department are put upon the same list and returned at the same election.

Scudéri, or SCUDÉRY (skû-dā-rē), MADELEINE DE, a French writer of romances, born at Havre in 1607, became one of the most conspicuous figures in the literary circle of the Hôtel Rambouillet at Paris, and acquired great fame by her romances, Artamène ou le Grand Cyrus, Ibrahim ou l'Illustre Bassa, Clélie, Almahide, and others of almost interminable length, almost entirely forgotten now, even by name. The secret of their great popularity at that time consists in this, that they were fairly representative of her age, being, in fact, the reflection of the society in which she moved. Her nominal heroes and heroines were classical or oriental personages, but the names of her characters were, in fact, only a transparent mask behind which her readers saw and read themselves. The interminable conversations and meaningless gallantries which make her works dull at present were precisely what gave them interest when all her characters were known; and as she was admired and respected by those she portrayed, it is evident they were flattered by her portraits. After the reunions at the Hôtel Rambouillet had been broken up by the troubles of the Fronde, Mdlle. de Scudéri opened her own house to a select society of similar tastes. She died in 1701.—Her brother, GEORGES DE SCUDÉRI, was a writer of tragedies, &c., and an enemy of Corneille. He was born in 1601, and died in 1667.

Egyptian.—From large figure in bronze.

Scudo (It. *scudo*, L. *scutum*, a shield), an ancient Italian coin, the equivalent of a crown. It was named from its bearing the impress of the heraldic shield of the sovereign by whom it was issued. The scudo was of different value in different states and at different times. The name is sometimes given to the piece of five lire or francs, nearly equivalent to the American dollar.

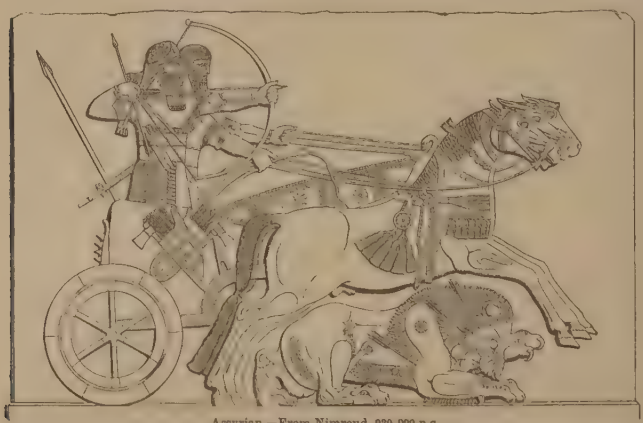
Scull. See *Rowing*.

Sculpin (*Cottus octodecimspinosus*), a small sea-fish found on the Atlantic seaboard and on the Pacific coast of America. The gemmeous dragonet (*Callionymus lyra*) is so called by the Cornish fishermen.

Sculpture is the art of imitating living forms in solid substances. The word means strictly, a cutting or carving in some hard material, as stone, marble, ivory, or wood; but it is also used to express the moulding of soft substances, as clay or wax, and the casting of metals or plaster. The imitation of living form is alike the essence of sculpture and of painting, and both these arts are primarily for the use and purposes of architecture. Sculpture is distinguished from architecture by its imitation of living form, and is separable from painting by the mode of its expression. Sculpture may possess the added element of colour; but while painting makes its appeal to the sense of sight chiefly through colour, sculpture concerns itself wholly with pure form, whether of line or composition.

Processes.—In producing a work of sculpture two processes are involved, 'modelling' and 'casting,' the former alone being truly the work of the artist. For ornament and figure the same method is employed. In the former a ground of clay is prepared, and upon it the lines of the ornament are lightly sketched, usually with a tool. These are then clothed upon firstly with important masses, then the connecting lines, and, lastly, the minor detail, the whole being afterwards modelled to the forms desired. For a head or bust a flat board, set on a high stand, with a piece of wood standing at right angles to it, is used. Lead-piping is sometimes further employed to raise the height of this piece of wood, and around this structure the clay is roughly built up, a cylindrical mass for the neck, and an egg-shaped form for the head. Upon this latter the position of the features is marked, and the work carried on by reference to the living

model. For a full-length figure an 'armature' is prepared, consisting of an iron passing through the centre and attached to which are other irons in the case of statues, or of lead-piping for statuettes. These are bent to the required positions, the whole when complete representing in line the pose and character of the intended figure. Upon and around this framework the figure is first roughly built up with clay, care being taken to add just as much as is requisite, and to follow the general form and direction of the muscles. The essential difference between modelling and carving is that in the former the artist works from within outwards by the addition of material, while in the latter from without inwards by the taking away of material. The sculptor's work proper generally ends with the completion of the clay model. The next process is that of casting. Plaster of Paris of the consistency of thick cream is poured over the model to



Assyrian.—From Nimroud, 930-920 B.C.

the depth of from 2 to 3 inches, the inner layer being coloured. When this is set, the clay is carefully removed, and what is termed a 'waste mould' is formed. This is carefully washed and when dry is then oiled. Into this mould plaster of Paris is poured, and when filled and set hard the waste mould is chipped off. The plaster of Paris has taken the place of the clay, and formed what is called a 'cast.' A head is usually cast in halves, and a similar treatment is adopted in the case of complete figures. This is termed 'piece moulding.' Parts which project very much are removed and cast separately, being afterwards attached by means of plaster of Paris. The reproduction of this plaster cast in marble or stone is a mechanical operation, usually intrusted to a skilled workman. To aid him he employs a 'pointing machine,' by which he first finds out the distance of any point on the cast from an imaginary vertical plane placed in front, and into the block of marble drills a hole whose depth from the same plane equals this distance. Innumerable holes are thus drilled, and the solid marble cut away until the bottoms of all the holes are reached. This gives the form roughly, and the carver proceeds to copy from the plaster cast, carrying on the work under the supervision of the sculptor, who rarely carves the work himself except in finishing touches. For casting in metal a plaster mould is first made as already described. Within this is fixed a rudely-formed, solid, but removable mass called a 'core,' the space between it and the surface of the mould being filled with the molten metal. Another method for smaller work is called '*cire perdue*.' In this the mould is lined with wax and the core inserted close up to the wax lining. The wax is then melted out and the molten metal poured into the mould to take its place, the core being afterwards removed.

History: Sculpture in Asia.—The earliest records of sculpture that we possess, exhibit the art in complete bondage to religion. The artist has striven not to represent human or natural beauty, but to illustrate a strange and fantastic mythology. Sculpture has here no independent existence, and no chance of gradual and steady development. The artist is restricted to the patient and often exquisite imitation of inanimate nature, or to the invention of monstrous human form, but he is not able to rise to a conception of beauty, at once true to physical nature and charged with human emotion. Thus the sculptures of India and China are semi-barbaric and naturalistic; and in the colossal figures of the rock-cut temples of India there is a superadded symbolism, which led to the most extravagant deformities of the human

Grecian.—1, Faun of Praxiteles—Florence. 2, Niobe—Florence. 3, Amazon—the Vatican.

figure. It is to Egypt that we must turn for the first signs of higher and more vital art. The distinctive characteristics of Egyptian sculpture are colossal size, stability, and symmetry, the expression being that of calm repose and solemnity, with a suggestion of the supernatural. A conventional uniformity reigns everywhere without life or action. Everything is subject to symbolic meaning according to formulæ laid down by authority. The work was executed in syenite or basalt, and this symbolism, linked with admirable regularity of workmanship, give to Egyptian sculpture the distinction and dignity of a style. The best period of Egyptian sculpture was from 1450 to 1000 B.C. The best period of Assyrian sculpture as a style, is inferior to that of Egypt. Its characteristics are an intense and vigorous spirit of representation without the least reference to ideal beauty of any kind. As compared with Egyptian work it is more realistic but less true. It is powerful and energetic, but lacks grandeur; overladen with detail and ornamentation it does not attain to the sublime in its repose, nor to beauty in its movement. Persian sculpture (560–331 B.C.) differs but little from Assyrian, and is usually included with it. Roughly hewn and badly modelled, the force of the animal forms yet gives it a sense of the gigantic, analogous to that obtained by the Greeks in their treatment of Hercules, but withal possessing no sense of ideal beauty. In the British Museum is to be found a splendid collection of Egyptian sculptures, extending from B.C. 2000 to the Mohammedan invasion, A.D. 640.

Greek Sculpture.—These early products of art, valuable in themselves, are nevertheless chiefly interesting as leading the way to the full development of sculpture under the Greeks. Greek sculpture, in its infancy, is strongly stamped with oriental character, as

may be seen by a careful examination of the reliefs from the temple of Assos now in the Louvre, and the metopes from Selinus, casts of which are in the British Museum. But from the end of the 6th century B.C. the development of Greek art was rapid and continuous. In the sculptures for the temple of Egina, executed about 475 B.C., and now preserved at Munich, the figures of the warriors (see the casts in the British Museum) are no longer of stiff conventional type, with attitudes correct but lifeless; there is energy and movement in their action, and a living truth of gesture only to be gained by artists who had studied the human form long and attentively. Upheld on the one hand by a noble mythology, that magnified without distorting human attributes, and supported on the other by an increasing knowledge of nature, the ultimate perfection of Greek art became only a question of time. It came to perfection in Phidias, whose statues of Athene in the Parthenon at Athens (B.C. 438), and of Zeus in the temple at Olympia, mark the period of the highest style of Greek art. The spe-

Renaissance.—1, St. George, Donatello, Florence. 2, Moses, Michael Angelo. 3, Nymph, Goujon

vial character of the art that flourished at Athens under the rule of Pericles (4th century B.C.), and by the all-potent hand of Phidias, consists in a perfect balance and combination of elements sublime and human. Sculpture had reached that point when a faultless imitation of nature was within its reach, but it had not yet abandoned its spiritual connection with a splendid mythology. We have therefore, in the sculpture of this period, the highest type of human beauty joined to a god-like calm and reticence of emotion. Examples of the grand style of this epoch are the sculptures of the Parthenon; the colossal bronze head of Artemis in the British Museum; the Venus of Milo, in the Louvre; and the exquisite relief representing the parting of Orpheus and Eurydice, in the Museum at Naples. Greek art, however, rapidly moved towards a still closer imitation of actual human life. The calm elevation of spirit characteristic of the sculpture of Phidias, and of his pupil Alcamenes, was exchanged for a more lifelike rendering of passion, and the artist began to be fascinated by the force and variety of human feeling as well as by the beauty of human form. The representatives of this later style were Scopas and his younger contemporary Praxiteles. The most important works of Scopas that survive are the decorations to the mausoleum at Halicarnassus, erected by Artemisia over the remains of her husband Mausōlos, prince of Caria, B.C. 352. These sculptured decorations, now in the British Museum, present in the designs for the frieze, depicting a battle between Greeks and Ama-

zons, an invention of graceful and energetic movement, and a record of rapid and violent gesture such as clearly distinguish the work from that which it succeeded. The works of Praxiteles are especially valuable as expressing a tenderness of feeling which this new and closer sympathy with human emotions had developed. He is known to us chiefly through copies of his works, or of the works of his school, the most celebrated of which are preserved in the Vatican; but the sweetness and delicate grace of his style are admirably displayed in the statue of Ceres discovered at Cnidus, and now in the British Museum. To this period belong the celebrated group of Niobe and her Children; also the bronze figure of Narcissus in the Naples Museum. From the death of Alexander the Great, B.C. 323, onwards to the conquest by the Romans, B.C. 146, the progress of Greek sculpture is only a further, and often a weaker, development of the same ideal. The celebrated group of the Laocoön, the head of the Dying Alexander, the Dying Gladiator, and the Apollo Belvedere, are some of the works of this epoch that are preserved to us.

St. Michael and Satan.—Flaxman.

Italy.—The history of sculpture in Italy is only a continuance of its story in Greece. It was Greek art produced by Greek workmen that adorned the palaces of the emperors; and the Roman sculptors, in so far as they had any independent existence, can only claim to have impoverished the ideal they received from Greece. Many of the best-known statues in existence were produced in the Græco-Roman period; as the Borghese Gladiator in the Louvre, the Venus de Medicis at Florence, and the Farnese Hercules at Naples. From the time of Hadrian (A.D. 138) art rapidly declined, and this debased Roman was the only style employed in Italy until the revival in the 12th century. This revival of sculpture began with Nicola Pisano, who was born at Pisa about A.D. 1206, and whose work is preserved in the pulpits which he carved at Pisa and Siena. He was followed by his son Giovanni Pisano (died 1320), whose great work is the allegorical group in the Campo Santo of Pisa; but both of these sculptors worked on classic lines. Jacopo della Quercia (1374–1438), whose beautiful reliefs adorning the façade of the Church of San Petronio at Bologna show a feeling for grace not before expressed, was the founder of the modern school. Lorenzo Ghiberti (1381–1455) developed a more pictorial style with extraordinary success; but sculpture awaited the advent of Donatello (1386–1468) in order to find its true direction and to reach its full triumph. His marble statue of St. George, in the church at Or San Michele in Florence, is one of the very finest works of renaissance sculpture, Luca della Robbia (1400–81), and Andrea Verrocchio (1432–88), the master of Leonardo da Vinci, may also be named. The special tendencies of Italian sculpture may be said to have reached their full expression in the work of Michael Angelo (1475–1564). Here we see all previous efforts to interpret passion and feeling summed up and concluded. His figures are charged with all the possibilities of human experience and emotion. It was towards this complete understanding of the resources of physical expression that all Italian art had been tending, and it is only more fully exhibited in Michael Angelo because he was the greatest master that Italy produced. His works are the statues in the chapel of the Medici at Florence, the Captives in the Louvre, the colossal David at Florence, the Moses in Rome, and the Madonna in Bruges. For a long period after Michael Angelo, Italian

sculptors were content to imitate, and sometimes to exaggerate his manner. Lorenzo Bernini (1598–1680), the master of the 'baroco' style, exemplifies a straining after grace and elegance by means of affectation. In the 18th century Italy became the headquarters of the classical revival which spread thence throughout Europe. The leading spirit in this movement was Canova (1757–1822), who, although he failed to restore to his art its earlier masculine strength, at least sought in the study of the antique for greater simplicity and elegance in representation. Canova's most finished productions are notable for an affectionate tenderness of sentiment rather than imagination, and his figures are never formed after the highest ideal. But within the narrower limits of his style he produced much that is graceful, and he combined in a manner peculiar to himself a reminiscence of antique grace, with a feeling entirely modern and almost domestic in its tenderness. His most characteristic works are the Graces, the Hebe, and the Cupid and Psyche (all well known), but his finest work is the colossal group of Theseus slaying a Centaur at Vienna. Canova formed Thorvaldsen, the great Danish sculptor, and his name and influence dominated the art of sculpture throughout Europe for many years. His pupils were Tenerani and Giacometti, and among later sculptors occur the names of Bartolini and Dupré. Italian sculpture of to-day has a strong bias towards realism, the chief exponents being Monteverde and Gallori, Magni and Barzaghi, though Consani, Albani, and Fedi form exceptions.

John Hampden.—Foley.

France.—The early art of France was influenced by the then prevailing styles. Thus the sculptures of her cathedrals show Byzantine, Romanesque, and Gothic influences, the finest examples in this last being at Amiens. Awakening in the 15th century it produced as precursors of the renaissance Bouteillier and Colombe (1431–1514), and in the 16th century Jean Goujon (1530–72), whose best work is the Fountain of the Innocents in Paris, and whose Diana shows all the faults and beauties of the style. Cousin (1501–89), Pilon (1515–90), Pierre Puget (1622–94), Coysevox (1640–1720), and Girardon (1630–1715) continued the style, which, whilst aiming at elegance and grace, lost simplicity and roundness. The Danish school which produced Thorvaldsen, owes its rise to French influence. Later yet come Houdon (1741–1828), Bosio (1769–1845), Rude (1785–1855), Barye (1795–1875), a sculptor of animals, and Carpeaux, whose chief work La Danse is in front of the new opera house (1827–75); and among living artists are St. Marceaux, Frémiet (animal), Falguière, Mercié, Dalou, Rodin, and Dubois (monument of General Lamoricière), who form a school which is the foremost and most vital in Europe.

Germany.—There was no early school of German apart from the general Gothic style of all northern European countries, but with the renaissance of the 15th century arose Adam Krafft (1480–1507) and Peter Vischer, two contemporary sculptors of Nuremberg, and Albert Dürer (1471–1528), painter and sculptor. Then came a break until the rise of the modern school, which owes its existence to the influence of Thorvaldsen. The chief names are Dannecker (1758–1841), with his Ariadne and Schadow with Girl tying her Sandal (1764–1850). Rauch (1777–1857) was the real founder of the modern German school. His monument to Frederick the Great at Berlin, with its many accessory figures, is his finest work, and from his school came Rietschel (1804–60) Schwanthaler (1802–48), August Kiss (1802–65), Bandel (1800–76), and Drake (1805–82). Schilling is the most noted among the living sculptors of Germany.

England.—Of examples of sculpture executed before the 18th century England possesses very few. Several tombs exist, and some of our cathedrals, notably Wells, Exeter, and Lincoln, possess figures executed presumably by Englishmen at an earlier date. It is not, however, until the reign of

Charles I. that names of artists appear, notably among them being Nicholas Stone (1586–1647), and Grinling Gibbons (1648–1721), who was the first real artist of the English school. Cibber may be mentioned, but Joseph Wilton was the forerunner of the school which produced Banks and Flaxman. Banks (1735–1805) is the father of ideal English sculpture, but died unappreciated, leaving John Flaxman (1755–1826) to achieve the task of bringing the classical spirit into English art, and founding the school of the 19th century. His love for severe simplicity and true form was imbibed in Rome, and is best seen in his Shield of Achilles, in his Michael overcoming Satan, and his Cephalus and Aurora. He greatly assisted Wedgewood in the design and decoration of his pottery, and executed a number of beautiful designs in outline illustrative of Homer and of Dante. His most famous pupil was Baily (1788–1867), whose Eve at the Fountain is much admired. Sir Francis Chantry (1788–1841) worked chiefly on portrait figures and busts, and Sir Richard Westmacott (1799–1856) on monuments. John Gibson (1791–1866), a pupil of Canova, more properly belongs to the Italian than the English school, his whole artistic life having been passed in Rome. His finest works are Psyche borne by Zephyrs, the Narcissus, Hylas Surprised, a large relievo of Christ blessing Children. The Hylas is now in the National Gallery. His introduction of colour in statuary raised much discussion. Foley (1818–75), whose chief work is the equestrian statue of General Outram, now at Calcutta, and Patrick Macdowall (1799–1870) with Love Triumphant, are the last names of the classic school. The tendency of sculpture in England at the present day is towards a more original and naturalistic treatment. Alfred Stevens (died 1875) is the author of the finest decorative work in England, the monument of the Duke of Wellington in St. Paul's, London; and among the more distinguished of the moderns are Woolner, Boehm, Thornycroft, Gilbert, Brock, and Leighton, whose works, with those of some younger men, go far to give English sculpture a high place.

American sculpture is entirely due to Italian influence exercised over Americans working in Italy. Chief among the American sculptors are Crawford Akers, Hiram Powers, and W. W. Story; others being Miss Hosmer (a pupil of Gibson), Gould, Ball, and Couper.

Sculptured Stones, a name specially given to certain ancient monuments with sculptured ornaments or devices, sometimes with inscriptions, found in the British Islands. Some of the inscriptions are in debased Latin. A good example of this class, called the Catt Stane, is found in the parish of Kirkliston, near Edinburgh. It is a monolith, composed of a large boulder of trap about 4½ feet in height, with an imperfect inscription, which marks it as a sepulchral stone. But the most remarkable stone of this kind is a granite monolith at Newton, Aberdeenshire, with a tolerably well preserved inscription, which has completely baffled the antiquaries. Another class of sculptured stones of a still more remarkable character occurs exclusively in the north-eastern Lowlands of Scotland, the last resort of the Picts, to whom they are generally attributed. None are found in Ireland, or any other part of Britain, or in Norway, Sweden, or Denmark. The peculiarity of these stones consists in certain symbols, supposed to be of religious character, but of which nothing certain is known, and no plausible interpretation has been given. The symbols are known from their shapes by such names as the conjoined circles or spectacle symbol; the Z symbol, often in combination with these; the crescent and V symbol; the comb and mirror symbol; the serpent and a creature somewhat resembling an elephant being also found. They are divided into two distinct classes: an earlier, in which the symbols appear on unhewn stones; a later, in which they are accompanied with the sign of the cross, and combined with purely ornamental sculpture. It is hence assumed that the symbols were originally pagan, but were adopted in a spirit of accommodation by the early Christians on their monuments. Oghams (which see) are also found on some of the stones. It is conjectured they have been added at a later period, but whether as an interpretation of the earlier signals or not is not known, as they have not been deciphered. The stones are probably sepulchral.

Scuppers, channels cut through the sides of a ship at the edges of the deck to carry water off the deck into the sea.

Scurvy, a disease of a putrid nature prevalent in cold and damp climates, and which chiefly affects sailors, and such as are deprived of fresh provisions and a due quantity of vegetable food. It seems to depend

more on a defect of nourishment than on a vitiated state; and not to be of a contagious nature. It comes on gradually, with heaviness, weariness, and unwillingness to move about, together with dejection of spirits, considerable loss of strength, and debility. As it advances in its progress the countenance becomes sallow and bloated; respiration is hurried on the least motion; the teeth become loose; the gums are spongy; the breath is very offensive; livid spots appear on different parts of the body; old wounds, which have long been healed up, break out afresh; severe wandering pains are felt, particularly by night; the skin is dry; the urine small in quantity; and the pulse is small, frequent, and towards the last intermitting; but the intellect, for the most part, clear and distinct. By an aggravation of the symptoms the sufferer in its last stage exhibits a most wretched appearance. Scurvy as usually met with on shore is unattended by any symptoms other than slight blotches, with scaly eruptions on different parts of the body, and a sponginess of the gums. In the cure, as well as the prevention of scurvy, more is to be done by regimen than by medicines, obviating as far as possible the several remote causes of the disease; but particularly providing the patient with a more wholesome diet, and a large proportion of fresh vegetables. Both as a preventive and as a curative agent lime or lemon juice is of the first importance in this disease.

Scurvy-grass (*Cochlearia officinālis*), a cruciferous plant, growing in Britain and elsewhere on the sea-shore and high up on the mountains. It has long been esteemed for its anticorbutic property, and hence its name. The leaves are slightly pungent, and are sometimes used as a salad.

Scutage, or ESCUAGE (L. L. *scutagium*, from L. *scutum*, a shield), in feudal law, the service by which a vassal was bound to follow his lord to war at his own charges. It was latterly commuted for a pecuniary satisfaction and became a parliamentary assessment, the custom of commuting service having become general and the rate of commutation variable.

Scu'tari, a town of Asiatic Turkey, on the Bosphorus, opposite Constantinople, of which it is a suburb. It is built on an amphitheatre of hills, and contains numerous mosques, fine bazaars and baths, barracks, and a seraglio of the sultan. Behind the town is an immense cemetery. Scutari contains granaries and is a fruit market. The manufactures are saddlery, silk, muslin, and cotton stuffs. Pop. 60,000.

Scu'tari, a town of European Turkey, capital of North Albania, at the south end of the lake of same name. It has manufactures of arms and cotton stuffs, and being situated on the Bojana, by which the lake (18 miles long by 6 wide) discharges its waters into the Adriatic, is favourably situated for commerce. Pop. 24,500.

Scutcheon. See *Escutcheon.*

Scutching Machine, a machine for rough-dressing fibre, as flax, cotton, or silk.

Scylla, a rock in the Strait of Messina, on the Italian side nearly opposite the whirlpool of Charybdis. Various legends were associated with Scylla and Charybdis, which were esteemed highly dangerous to navigators. See *Charybdis.*

Scyl'lidæ, the dog-fishes, a family of small-sized but very abundant sharks, three species of which occur off the British coasts. See *Dog-fish.*

Scym'nidæ, a family of sharks, distinguished by the absence of an anal fin, and by dorsals unfurnished with spines. The lobes of the caudal fin or tail are nearly equal, and the head is furnished with a pair of small spiracles. The Greenland shark is the best-known species.

Scyros. See *Skyros.*

Scythe, an instrument used in mowing or reaping, consisting of a long curving blade with a sharp edge, made fast at a proper angle to the lower end of a more or less upright handle, which is bent into a convenient form for swinging the blade to advantage. Most scythes have two short projecting handles fixed to the principal handle, by which they are held. The real line of the handle is that which passes through both the hands, and ends at the head of the blade. This may be a straight line or a crooked one, generally the latter, and by moving the short handles up or down the main handle, each mower can place them so as best suits the natural size and position of his body. For laying cut corn evenly, a *cradle*, as it is called, may be used. The cradle is a contrivance somewhat resembling a rake, with three or four long teeth so fixed to the scythe as to stretch the cut grain properly at each sweep of the scythe. A species of scythe which has been called the cradle-scythe is regularly used with the cradle for reaping in some localities. One form of scythe has a short branching handle some-

what in the shape of the letter Y, having two small handles fixed at the extremities of the two branches at right angles to the plane in which they lie. The Hainault scythe is a scythe used with only one hand, and is employed when the corn is much laid and entangled. The person has a hook in one hand with which he collects a small bundle of the straggling corn, and with the scythe in the other hand cuts it.

Scyth'ians, a name very vaguely used by ancient writers. It was sometimes applied to all the nomadic tribes which wandered over the regions to the north of the Black and the Caspian Seas, and to the east of the latter. In the time of the Roman Empire the name Scythia extended over Asia from the Volga to the frontiers of India. The people of this region, being little known, were the subject of numerous fables.

Scyth'rops, the channel-bill, a genus of birds belonging to the cuckoo family. Only one species is known, the *S. Novæ Hollandiæ*, a very handsome and elegantly coloured bird inhabiting part of Australia and some of the Eastern Islands, about the size of the common crow. It has a large and curiously formed beak, which gives it so singular an aspect that on a hasty glance it might almost be taken for a toucan or hornbill.

Sea. See *Ocean*.

Sea-acorn. See *Balanus*.

Sea-anemone, the popular name given to a number of animals of the sub-kingdom Cœlenterata and class Actinozoa, including the genus *Actinia* and other genera. They are among the most interesting organisms met with on the sea-beach, and in aquaria form a great attraction. All sea-anemones, however varied in coloration or form, present the essential structure and appearance of a fleshy cylinder, attached by its base to a rock or stone, and presenting at its free extremity the mouth, surrounded by a circlet of arms or tentacles. With these tentacles, which may be very numerous, in some cases exceeding 200 in number, they seize and secure their food—small crustacea, molluscs, such as whelks, &c.—which they paralyse by means of the thread-cells common to them with all Cœlenterata. The mouth leads into a stomach-sac, which, however, is imperfectly specialized, and is such that a generalized idea of the structure of a sea-anemone may be gained by supposing that the animal in transverse section represents a double tube, the outer tube corresponding to the body-walls, and the inner tube to the stomach-sac. When fully expanded the appearance of the anemones in all their varieties of colour is exceedingly beautiful. But upon the slightest touch the tentacles can be quickly retracted within the mouth-aperture, the fluids of the body are expelled by the mouth, and the animal, from presenting the appearance of a fully expanded

Sea-anemones.
a, Heliactis bellis. b, Cylista viduata.

flower, becomes a conical mass of jelly-like matter. Although these forms are attached to rocks and fixed objects, they appear able to detach themselves at will. They are, most of them, dicœcious, that is, having the sexes situated in different individuals. The young are developed within the parent body, and appear in their embryo-state as free swimming ciliated bodies of an oval shape. The sea-anemones resemble the *Hydræ* in their marvellous powers of resisting injuries and mutilation. Thus if a sea-anemone be divided longitudinally, a new animal will in due time be formed out of each half. They appear singularly insusceptible also to the action of hot or cold water, and seem to be wonderfully long-lived. A well-known instance of longevity on the part of the sea-anemone is that afforded by one named 'Granny,' which was taken by Sir John Dalyell in 1828, and lived till 1887. They are eaten as food in Italy, Greece, Provence, and on various other coasts.

Sea-ape, a name sometimes given to the fox-shark or thresher. See *Thresher*.

Sea-bathing produces the stimulating effects of the ordinary cold bath with the additional stimulus due to the salt, so that it acts as an invigorating tonic. Persons who are anæmic—that is of deficient quality of blood—and those suffering from any internal complaint ought to refrain from sea-bathing. It has, however, been found very

salutary in several complaints, as diseases of the glands of all kinds, and of the skin in scrofula and a scrofulous predisposition, exhausting sweats, and tendency to catarrhs, chronic nervous diseases, particularly hysteric attacks, epilepsy, St. Vitus's dance; also sometimes in chronic rheumatism.

Sea-bear, a name sometimes given to the polar bear (see *Bear*); also to a kind of seal. See *Seal*.

Sea-cat, a name given to the *Chimæra monstrosa*. See *Chimæra*.

Seacombe, an ecclesiastical district of Wallasey parish, Cheshire, forming a suburb of Birkenhead, is a favourite place of residence for the merchants of Liverpool. Pop. 10,586.

Sea-cow. See *Manatee*.

Sea-cucumber. See *Holothuria*.

Sea-dace. See *Bass*.

Sea-devil. See *Angler*.

Sea-dragon (*Pegăsus draco*), a teleostean fish included among the Lophobranchii (which see). The breast is very wide, and the large size of the pectoral fins, which form wing-like structures, together with its general appearance, have procured for this fish its popular name. *P. natans*, an allied species, has smaller pectoral fins and a larger body. The sea-dragon occurs in Javanese waters. The dragonets (*Callionymus*), fishes of the goby family (*Gobiidæ*), are also known as sea-dragons.

Sea eagle, a name applied to one or two members of the eagle family; but probably with most distinctive value to the cinereous or white-tailed eagle or erne (*Haliaëtus albicilla*), found in all parts of Europe. It is generally found inhabiting the sea-coasts, and although living mainly upon fish, yet makes inland journeys in search of food, and seizes lambs, hares, and other animals. The head is covered with long drooping feathers of ashy brown colour, whilst the body is of a dark-brown hue, streaked in some places with lighter tints, and having the primary feathers of the wing mostly black. The tail is rounded, and is of white colour in the adult, but brown in the young bird. The bird breeds in Shetland and in the Hebrides. Its average size appears to be about 3 feet in length, and from 6 to 7 feet in expanse of wings. The American baldheaded eagle (*Haliaëtus leucocephalus*) from its frequenting the sea-coasts is also named the sea-eagle. See *Eagle*.

Sea-ear. See *Haliotis*.

Sea-egg, the sea-urchin. See *Echinus*.

Sea-elephant. See *Elephant-seal*.

Seaford, a small town of England, in the county of Sussex, 3 miles S.E. of Newhaven, now a popular seaside resort. It sent two members to parliament from 1298 till 1832. Pop. 2425.

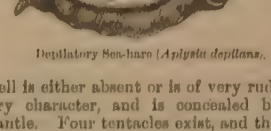
Sea-fox. See *Thresher*.

Sea-grape, a genus of plants, *Ephedra*, natural order Gnetaceæ, closely allied to the conifers. The species consist of shrubs with jointed stems, whence they are also called *Joint-firs*.

Sea-grass. See *Grass-wrack*.

Seaham Harbour, a seaport, England, county of Durham, 6 miles S. of Sunderland, has an excellent harbour for the shipping of coal. Pop. 8856.

Sea-hare (*Aplysia*), the name of a genus of gasteropodous molluscs. These animals are slug-like in appearance, and derive their popular name from the prominent character of the front pair of tentacles, which somewhat resemble the ears of a hare. The



Depilatory Sea-hare (*Aplysia depilans*).

shell is either absent or is of very rudimentary character, and is concealed by the mantle. Four tentacles exist, and the eyes are situated at the base of the hinder tentacles. The sea-hares are widely distributed throughout most seas, and generally inhabit muddy or sandy tracts. They emit a fluid of a rich purple hue, which, like the ink of the cuttle-fishes, has the property of diffusing itself quickly throughout the surrounding water. They are also known to discharge an acrid fluid of milky appearance, which has an irritant effect on the human skin, and in the case of *A. depilans* was thought to have the property of removing hair. *A. hybrida* is the common British species.

Sea-hedgehog. See *Echinus*.

Sea-hog. See *Porpoise*.

Sea-horse. See *Hippocampus* and *Lophobranchii*.

Sea-kale (*Crambe maritima*), a perennial cruciferous herb, a species of colewort, called also *sea-cabbage*. It is a native of the sea-coasts of Europe, and is much cultivated in England as a table vegetable, the blanched

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1, 2 Seals of Edward the Confessor, 1059. 3 Seal of Canterbury, 1175. 4
6, 7 Anthony Bek, Bishop of Durham, 1284. 8 Richard Kellan, Bishop of Durha
12 Merchant Taylors' Company, 1505 13 (Obverse), 14 (Reverse) Henry VIII, 154

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hen Langton, Archbishop of Canterbury, 1207. [5] Simon de Montfort, Earl of Leicester, 1258.
11. [9] London Mayoralty, 1381. [10] William de la Zouche, 1430. [11] John, Earl of Lincoln, 1467.
[15] (Obverse), [16] (Reverse) County Palatine of Chester, 1603.

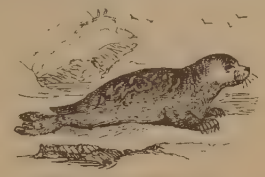
young shoots and leaf-stalks being the parts eaten.

Sea-king. See *Viking.*

Seal, an engraved stamp bearing a device or inscription pertaining to the owner; also, the impression of such a stamp on a plastic substance as wax. A seal upon a document was originally a substitute for a signature; a seal upon a place of deposit answered the purpose of security in a different manner from a lock. The use of seals is of the highest antiquity, and one of the earliest and commonest forms is the signet-ring. In Egypt impressions of seals were made in fine clay, and attached to documents by slips of papyri. The Romans used clay, bees'-wax, and in the time of the empire lead for taking impressions. In the time of Constantine flat metal seals called *bullæ* were used. The metals used were gold, silver, and lead, and the bullæ were attached to documents by silk or woollen bands. The leaden seal was adopted by the popes. (See *Bull.*) The western monarchs generally used bullæ up to the 16th century. The use of bees'-wax was introduced by the Normans; sealing-wax was invented in the 17th century. (See *Sealing-wax.*) Documents in England are still sealed in compliance with legal formality, but the true voucher to which alone any real importance attaches is the signature. There are three seals officially used in England by or in name of the sovereign — the great seal, the privy seal, and the signet. There is a similar set of seals for Scotland, which are only used for private rights and grants connected with that part of the kingdom.

Seal, the name applied collectively to certain genera of mammals, order Carnivora, section Pinnipedia or Pinnigrada, in which the feet exist in the form of swimming-paddles. Two distinct groups of seals are defined by zoologists, the *Phocidæ* or common or true seals, and the *Otaridæ* or eared seals.

The *Phocidæ*, or true or hair seals, have a body of fish-like contour. They have no external ear, and the hind limbs are permanently stretched out behind the body and parallel with the tail, a conformation obviously inappropriate and unsuited for supporting the body for locomotion on land, but admirably adapted for swimming. Five toes exist on each foot, and the middle digits of the hinder feet are much shorter than the outer ones. The toes, which are provided with claw-like nails, are united by a web of skin, and so form effective swimming paddles. The fore limbs are mere flippers. The dentition resembles that of carnivora generally. The fur generally consists of a dense thick under-fur and of an outer coat of longer and coarser hairs. The bones are of light spongy texture, and beneath the skin is a thick layer of blubber or fat. The eyes are large and intelligent, and the sense of smell is also well developed. The sense of touch appears to reside chiefly in the 'whiskers' of the face. The brain is of large size in proportion to the body, and when domesticated seals exhibit a very high



Marbled Seal (*Phoca discolor*).

degree of intelligence. They are polygamous, and seldom produce more than two young at a birth, one being the common number. They occur almost in all seas except those of tropical regions. In the northern regions they are more especially plentiful. They are largely hunted for their skins, which are converted into leather, and for their blubber, from which a valuable oil is obtained. The common seal (*Phoca vitulina*) is found widely throughout the northern regions, and also around the more northern coasts of Britain. Its average length is from 3 to 5 feet, and the fur is a grayish-brown, mottled with black. It is very destructive to most of the food fishes. It is much attached to its young, and is strongly attracted by musical sounds. It is never met with in large numbers, or far away from the land. Closely allied to the common seal is the marbled seal (*P. discolor*), met with on some of the European coasts. The harp seal, Greenland seal, saddleback, or atak (*Phoca grœnlandica*), inhabits almost all parts of the Arctic Ocean. The males average 5 feet in length, are coloured of a tawny gray, and on the back there is a dark mark resembling a harp or saddle in shape. In the spring, at breeding season, these seals resort in immense herds to the floes of the Arctic Ocean, around Jan Mayen Island, where

great numbers of them are killed annually by crews of the sealing vessels. The great seal (*Phoca barbāta*), which measures 8 or 10 feet in length, occurs in Southern Greenland. The gray seal (*Halichœrus gryphus*

Hooded or Crested Seal (*Cystophōra cristāta*).

or *griseus*), attains a length of from 8 to 9 feet, and is found on the Scandinavian and Icelandic coasts. The *P. caspica*, found in the Caspian Sea, and also in the Siberian lakes Aral and Baikal, attains a length of about 5 feet. The genus *Stenorhynchus* is represented by several species of the Southern Seas, and by the monk seal (*S. monăchus*) of the Mediterranean, which attains a length of from 10 to 12 feet, and seems to have been the seal best known to the ancients. The genus *Cystophōra* includes the large bladder-nose, hooded or crested seal (*C. cristāta*) of the Greenland seas, in which the nose of the males has a curious distensible sac, and which attains an average length of from 10 to 12 feet. It also includes the large sea-elephant, elephant-seal, or bottle-nosed seal (*C.* or *Morunga proboscidea*) of the Antarctic Seas, which attains a length of from 20 to 30 feet. See *Elephant-seal*.

The *Otaridæ* or 'eared' seals are distinguished by the possession of a small outer ear, which is absent in the *Phocidæ*, by a longer neck, better developed limbs, and a structural relationship which presents a much nearer affinity to that of the bears. Of these the northern sea-lion (*Eumetopias* or *Otaria Stelleri*), so called from the mane of stiff crisp hairs on its neck and shoulders, is a native of both the American and the Asiatic shores of the N. Pacific. The southern sea-lion (*Otaria jubata*) belongs to S. America. There is also a southern fur-seal (genus Arctocephalus), which was once very abundant at the Falkland Islands, but has almost been exterminated there. The best known fur-seal is the northern fur-seal which breeds on the islands of the Pribyloff group, off the coast of Alaska, and at the Commander Islands in the Behring Sea. The species found here is *Callorhīnus ursīnus* or *Otaria ursīna*. It visits those islands, making its appearance from the southward late in the spring, chiefly for reproductive purposes, leaving again about the end of October or beginning of November. Each old male mates with ten or fifteen or more females, whom he guards jealously, and in whose behalf he fights furiously. The female gives birth to one pup. The male attains maturity about the eighth year, when its length is from 7 to 8 feet, and its weight from 500 to 700 lbs. The outer and longer hairs of its fur are of a grayish-brown colour, the thicker underfur being darker or reddish-brown; and it is this fine under-fur which, when stripped of the coarse outer hairs and dressed by the furrier, affords one of the most beautiful and valued of the 'sealskins' of commerce.

The seal fisheries are divided into hair-seal fisheries and fur-seal fisheries. The principal seats of the hair-seal fishery are Newfoundland, Jan Mayen, and the Caspian Sea. Nearly half the total number of seals obtained is taken on the Newfoundland coast. The Jan Mayen fishery is carried on by the British, Norwegians, Swedes, Danes, and Germans, the number of seals taken by the British vessels being about equal to that taken by all the others together. The only British ports now engaged in the industry are Dundee and

Fur Seal (*Otaria ursina*).

Peterhead. Steamers are employed, and the vessels make the ice about the middle of March, and prosecute the seal fishing till about the middle of May, when they proceed to the whale fishing. The seals are taken either by clubbing them or shooting

them when congregated on the ice. The species taken are the same as those on the Newfoundland coast, the harp or saddle-back and the hood or bladder-nose. The skins are salted, and the fat is stowed into tanks, and manufactured into oil when the vessels reach home in the autumn. The blubber of about 100 seals yields a tun of oil. Owing to the reckless way in which the fishery has been conducted, seals have greatly diminished in numbers of late years in localities where they were formerly plentiful; but a 'close season' has now been established both in the Newfoundland fishery and the Jan Mayen fishery. The fur-seal fishery is carried on chiefly at the Pribyloff Islands, the United States government having leased them to a company with the right of killing 100,000 young males per annum. The States claimed the right to entirely prohibit sealing in Behring Sea, a claim which led to difficulties with Britain, and the case was decided against them by arbitration, except as regards the three-mile limit. However, by mutual arrangement, a close time is now in force for the seals within a certain area, and killing is entirely prohibited within certain limits.

Seal, Great, a seal used for the United Kingdom in sealing the writs to summon parliament, treaties with foreign states, and other papers of high moment. The lord-chancellor is keeper of the great seal, and this official is appointed by delivering the seal into his custody.

Sea-lemon (*Doris*), a genus of gasteropodous mollusca, section Nudibranchiata ('naked-gilled'), family Doridæ. It is destitute of a shell, and moves by means of a broad ventral foot. The gills exist in the form of a circle of plumes in the middle of the back, at the posterior extremity of the body, and can be retracted at will within the body. The name sea-lemon has been applied to these molluscs from their usually yellow colour and somewhat lemon-like shape. They may be found at low-water mark under stones and in similar situations. *Doris tuberculata*, or the 'sea-lemon' *par excellence*, is about 3 inches in length, of a yellow colour, and having the mantle warty.

Sealing-wax, a resinous preparation used for securing folded papers and envelopes, and for receiving impressions of seals set to instruments. Ordinary red sealing-wax is made of pure bleached lac, to which when melted are added Venice turpentine and vermilion. Inferior qualities consist of a proportion of common rosin and red-lead, and black and other colours are produced by substituting appropriate pigments. Sealing-wax was invented in the 17th century.

Sea-lion. See *Seal*.

Seal Islands. See *Lobos*.

Sealkote, or Sialkot, a town of India in the Punjab, 72 miles north-east of Lahore, is the scene of a famous annual fair, and a local trade centre of rising importance. The manufactures are paper and cloth. Pop. (including military cantonment), 45,762.

Seal-leather, a leather manufactured from sealskins. It is light, strong, and tough, and is finished either in a large coarse grain for bootmakers, or as an enamelled or japanned leather.

Sea-mat, or Hornwrack (*Flustra*), a genus of Molluscoida, class Polyzoa (which see). The sea-mat, which presents the appearance of a piece of pale brown sea-weed, is a compound organism, produced by a process of continuous gemmation or budding from a single primitive polypide, which latter was in turn developed from a true egg. Each little polypide or zoöid of the sea-mat possesses a mouth surrounded by a crown or circle of retractile, ciliated tentacles, a stomach, and intestine. *Flustra foliacea*, or the broad hornwrack, is a familiar species, as also are *F. truncata*, *F. denticulata*, &c.

Seamen, Laws Relating to. These in Britain are consolidated in the Merchant Shipping Act, 1854 (17 and 18 Vict. cap. civ.), amended by subsequent acts, and all now consolidated in 'The Merchant Shipping Act, 1894'. The local marine boards established in the different seaports, by establishing shipping offices, afford facilities for engaging seamen by keeping registers of their names and characters, superintend engagements and discharges, and facilitate the making of apprenticeships. The board of trade is to license persons to procure seamen, and penalties are inflicted for acting without a license. Agreements for foreign-going ships are to be made before and attested by a shipping master (superintendent or deputy superintendent). Running agreements are allowed in foreign-going ships with short voyages. Agreements for home shipping must be made before a shipping master or a witness. Penalties are incurred by shipping seamen without a duly executed agreement. Seamen engaged in foreign ports are to be shipped in presence and with the sanction of the consul. The discharge of a

seaman must also take place before a shipping master, and the seaman is entitled to a certificate of service and discharge. The shipping master is to act as referee in matters of dispute referred to him, and his adjudication is to be final if the amount in question does not exceed £5. A seaman cannot by agreement deprive himself of his legal right to sue for wages or salvage, but wages may be forfeited or reduced by desertion, wilful disobedience, want of due exertion, incompetency, and the like. Wages are to be paid on discharge, or within a limited time thereafter, varying according to circumstances. Wages cannot be attached; and in the event of a seaman's wife and family having during his absence become chargeable to the parish, the parish can only recover two-thirds of his wages at most. In case of non-payment, wages up to £50 may be sued for summarily. Officers of customs and consuls abroad are to take charge of the effects and wages of deceased seamen and remit to board of trade; effects and wages of seamen dying in the United Kingdom are to be handed to shipping master at port of discharge or to board of trade. Shipwrecked or distressed seamen abroad are to be sent home by the consular officers at the expense of the mercantile marine fund. Compensation is to be made for insufficiency or bad quality of water or provisions, but seamen may forfeit a week's wages for frivolous complaint. Seamen may be summarily punished by imprisonment and forfeiture of wages for desertion, refusal to join ship, absence without leave, disobedience, and other offences, but all offences must be entered in official logs, with reply of offender. Where a complaint is made to the board of trade or a retaining officer that a British ship is unsafe, the board or officer may, if they or he think fit, require the complainant to give security to the satisfaction of the board for the costs and compensation which he may become liable to pay. Provided that where the complaint is made by one-fourth, being not less than three, of the seamen belonging to the ship, and is not in the opinion of the board or officer frivolous or vexatious, such security shall not be required, and the board or officer shall, if the complaint is made in sufficient time before the sailing of the ship, take proper steps for ascertaining whether the ship ought to be detained under this act. Where a ship is detained in consequence of any complaint, and the circumstances are such that the board of trade are liable under this act to pay to the owner of the ship any costs or compensation, the complainant shall be liable to pay to the board of trade all such costs and compensation as the board incur or are liable to pay in respect of the detention and survey of the ship.

Sea-mouse (*Aphroditē*), a genus of dorsibranchiate Annelids or marine worms. The most notable feature in connection with the sea-mouse consists in the beautiful iridescent hues exhibited by the hairs or bristles which fringe the sides of the body. The sea-mouse inhabits deep water, and may be obtained by dredging, although it is frequently cast up on shores after storms. The common species (*A. aculeata*) of the British and French coasts is 6 or 8 inches long and 2 or 3 inches in width.

Seance', in spiritualism, a sitting with the view of obtaining 'manifestations,' or holding intercourse with spirits.

Sea-otter. See *Otter.*

Sea-pass, a passport carried by neutral vessels in time of war to prove their nationality, and so secure them from molestation.

Sea-pen. See *Pennatula.*

Sea-perch, a fish, *Labrax lupus.* See *Bass.*

Sea-pike. See *Gar-fish.*

Sea-pink (*Armeria maritima*), a small plant, the type of the genus *Armeria*, natural order Plumbaginaceæ. It is found on all the coasts of Britain, and on many of the mountains. In gardens it is often used as an edging for borders in place of box.

Search, Right of, in maritime law, the right claimed by a nation at war to authorize the commanders of their lawfully commissioned cruisers to enter private merchant vessels of other nations met with on the high seas, to examine their papers and cargo, and to search for enemy's property, articles contraband of war, &c.

Search-warrant, in law, a written authority granted by a magistrate to a legal officer to search a house or other place for property alleged to have been stolen and suspected to be secreted in the place specified in the warrant. Similar warrants are granted to search for property or articles in respect of which other offences are committed, such as base coin, coiners' tools, explosives, liquors, &c., kept contrary to law.

Sea-scorpion. See *Scorpion-fish.*

Sea-serpent, a marine serpentine form of large size, or sea-monster of doubtful character, frequently alleged to have been

seen. From the numerous substantiated accounts of animals of one kind or another, but differing from all described and known forms, having been seen, often close at hand, by the crews and passengers of ships, and by respectable observers on land, we are shut up to the choice either of believing that in every case the senses of the observers must have been mistaken, or that some living form must have been seen in the majority of cases. Careful research, and the weighing of the evidence presented in the accounts of 'sea-serpent' phenomena, show that the subject demands, at least, investigation. See *Kraken*, *Sea-snake*.

Sea-shore, in law, signifies the strip surrounding a coast between high and low water mark.

Sea-sickness, the name given to the nausea and other disagreeable sensations produced on those unaccustomed to a seafaring life by the rolling motion of a vessel at sea. The exact causes and etiology of this complaint are as yet imperfectly understood. Some observers have referred the malady to causes entirely dependent upon the altered or affected functions of the nervous centres; others to the regurgitation of bile into the stomach; and others, again, to the irritation of the liver consequent on the unusual movements of the body. Probably all three views contain a certain amount of truth. The measures which have been suggested for sea-sickness are preventive or curative. Preventive measures, so far as the construction of the *vessels themselves* are concerned, have not proved of much practical utility. Preventive measures, regarded from the *patient's* point of view, are practically limited to the regulation of the diet, which for some days previously to undertaking the voyage should be plentiful, but of light and nutritious character. The bowels should not be constipated above all things; and food should not be taken for at least five or six hours before going on board. A cup of strong coffee, swallowed just before embarking, proves beneficial to some as a nerve stimulant; while others derive benefit from a nerve sedative, such as bromide of potassium, chloral, or opium; but these, especially the two last, should never be used save under strict medical direction. Nitrite of amyl and cocaine have also been used. Once on board the ship, a position as near the centre of the vessel as practicable is to be preferred, and the posture in lying should be that on the back, with the head and shoulders very slightly elevated. With reference to *curative* measures, during the attack of nausea and vomiting, some derive benefit from a bandage applied moderately tight across the pit of the stomach; some from small doses of brandy and ice; some from saline effervescing drinks; and some from frequent draughts of lukewarm or even cold water.

Seaside Grape, a small tree of the genus *Coccoloba* (*C. uvifera*), natural order Polygonaceæ, which grows on the sea-coasts of Florida and the West Indies. It has clusters of edible fruit somewhat resembling the currant in appearance, a beautiful hard wood which produces a red dye, and yields the extract known as *Jamaica kino*.

Sea-slug, a name applied generally to Sea-lemons (which see) and other gasteropodous molluscs destitute of shells, and belonging to the section Nudibranchiata.

Sea-snake, a name common to a family of snakes, Hydridæ, of several genera, as *Hydrus*, *Pelamis*, *Chersydrus*, &c. These animals frequent the seas of warm latitudes.

Sea-snake (*Hydrus Stokesii*).

They are found off the coast of Africa, and are plentiful in the Indian Archipelago. They are all, so far as known, exceedingly venomous. They delight in calms, and are fond of eddies and tide-ways, where the ripple collects numerous fish and medusæ, on which they feed. The *Hydrus Stokesii* inhabits the Australian seas, and is as thick as a man's thigh.

Sea-snipe. See *Bellows-fish*. The name Sea-snipe is also given to the Dunlin (which see).

Seasons, the four grand divisions of the year—spring, summer, autumn, winter. These have distinctive characters, best seen in the temperate zones. Within the tropics they are not so much marked by differences of temperature as by wetness and dryness, and are usually distinguished as the wet and dry seasons. Astronomically speaking, spring is from the vernal equinox, when the sun enters Aries, to the summer solstice;

summer is from the summer solstice to the autumnal equinox; autumn is from the autumnal equinox to the winter solstice; winter is from the winter solstice to the vernal equinox. The characters of the seasons are reversed to inhabitants of the southern hemisphere. See *Spring*, *Summer*, *Autumn*, *Winter;* also *Climate*, *Earth*, *Equinox*, &c.

Sea-spider, or SPIDER-CRAB, a marine crab of the genus *Maia* (*M. squinado*). Its body is somewhat triangular in shape, and its legs are slender and generally long. It lives in deep water, and is seldom seen on the shore.

Sea-squirts, a name sometimes applied collectively to all the Tunicata, or more especially to the genus *Ascidia* (see *Ascidia*). The name 'sea-squirts' has been applied from their habit of emitting jets of water from the orifices of the body when touched or irritated in any way.

Sea-surgeon, or SURGEON-FISH (*Acanthūrus chirurgus*), a fish belonging to the teleostean section of Acanthopteri, so named from the presence of a sharp spine on the side and near the extremity of the tail, bearing a resemblance to a surgeon's lancet. It occurs on the Atlantic coasts of South America and Africa, and in the Caribbean seas. Its average length is from 12 to 19 inches.

Sea-swallow, a name given to the common tern and also to the stormy petrel.

Sea-toad, a name given to the great spider-crab (*Maia* or *Hyas araneus*), found on British coasts at low-water mark.

Seattle (sē-at'l), capital of King county, state of Washington, United States, on Seattle Bay, east side of Puget Sound, the largest city in the state and the seat of the state university. It is a rapidly growing place, with numerous industrial establishments, such as shipyards, foundries, machine-shops, saw-mills, breweries, and an active trade in coal and lumber. A considerable portion of the town was destroyed by fire in 1889. Pop. in 1880, 3533; in 1890, 42,837; in 1895, 50,000.

Sea-unicorn, a popular name given to the narwhal (which see).

Sea-urchin. See *Echinus*.

Sea-water, the salt-water of the sea or ocean. Sea-water contains chlorides and sulphates of sodium (chloride of sodium = common salt), magnesium, and potassium, together with bromides and carbonates, chiefly of potassium and calcium.

Sea-weed, any plant growing in the sea; but the name is usually confined to members of the natural order Algæ (which see).

Sea-wolf (*Anarrhichas lupus*), a genus of teleostean fishes, section Acanthopteri, family Blenniidæ or blennies (also known by the names 'sea-cat' and 'swine-fish.'). The mouth is armed with sharp, strong teeth of large size, and when captured it is said to bite the nets and even attack the fishermen. It is the largest of the blennies. Around the coasts of Britain it attains a length of 6 or 7 feet, but in more southern seas it is said to grow to a still larger size. The flesh is palatable, and is largely eaten in Iceland, whilst the skin is durable, and is manufactured into a kind of *shagreen*, used for making pouches and like articles. See also *Bass*.

Seba'ceous Glands, small structures of glandular nature and sacculated form which exist in the substance of the *corium*, or deeper layer of the dermis or true skin, and secrete a fatty matter. They are very generally distributed over the entire skin surface, but are most numerous in the face and scalp. Those of the nose are of large size, but the largest in the body are those of the eyelids — the so-called *Meibomian glands*. They appear to be absent from the skin of the palms of the hands and soles of the feet. Each sebaceous gland consists essentially of a lobulated or sac-like structure, with cells which secrete the sebaceous or glutinous humour, and with a single efferent duct; and these ducts open into the hair-follicles, or sac-like involutions of the skin which surround and inclose the roots of hairs, or simply on the external surface of the skin. The functions of the sebaceous secretion are chiefly those of keeping the skin moist.

Sebas'tes, a genus of acanthopterygious fishes, containing the bergylt or Norway haddock. See *Bergylt*.

Sebas'tian, DOM, King of Portugal, posthumous son of the Infant John and of Joanna, daughter of Charles V., was born in 1554, and ascended the throne in 1557, at the death of his grandfather, John III. In 1578 he led the flower of his nobility into Africa on a wild expedition against the Moors, and perished in battle with nearly all his followers. He had no immediate heir, and Portugal was soon annexed by Philip II. of Spain, but the masses of the people refused to believe in his death, and several pretenders to his name and claims received a measure of popular sup-

port. The belief in the future return of Dom Sebastian lingered long in Portugal, finally taking the form of a myth, and giving rise to a considerable literature of poems and romances.

Sebastian, SAN. See *San Sebastian.*

Sebastian, ST., Christian martyr, was born at Narbonne, and under Diocletian was captain of the prætorian guard at Rome. He rose to high favour at court, but declaring himself a Christian, and refusing to abjure, he was tied to a tree and pierced with arrows. A Christian woman named Irene, who came by night to inter his body, finding signs of life in him, took him home, and nursed him till he recovered. He then presented himself before Diocletian, and remonstrated with him on his cruelty; whereupon the emperor ordered him to be beaten to death with rods (January 20, 288), and his body to be thrown into the cloaca. His protection was invoked against pestilence, and his martyrdom has been a favourite subject with painters.

Sebastiano del Piombo. See *Piombo.*

Sebas'topol, a Russian town and naval station on the Black Sea, in the south-west of the Crimea. The town lies chiefly on

the south side of a large and deep inlet of the Black Sea running east for a distance of nearly 4 miles, with an average width of ¾ mile narrowing to 930 yards between the promontories at its mouth, and a depth of from 6 to 10 fathoms. There are also smaller inlets from the main harbour penetrating southward at the town itself. Sebastopol has grown up since 1780, when it was a mere Tartar village. On the outbreak of the Crimean War, when the population amounted to 43,000, it became the point against which the operations of the allies were mainly directed, and its siege forms one of the most remarkable episodes in modern history. (See *Crimean War.*) The town, then utterly destroyed, has been reconstructed, and though the treaty of Paris stipulated that no arsenal should exist on the Black Sea, and that the town should not again be fortified, these restrictions were abrogated in 1871, and the fortifications bid fair to exceed the former strength. Railway communication with Moscow has greatly improved the trade. There are many new important public buildings, and the monuments and relics of the siege are interesting. Pop. 35,648, largely military.

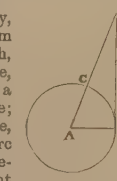
Seben'ico, a town in Austria, Dalmatia, on a creek of the Adriatic, near the mouth of the Kerka, between Zara and Spalato. It is the seat of a bishop, and its Italian Gothic cathedral, of the 15th and 16th centuries, is considered the finest church in Dalmatia. It has an excellent harbour, and is the entrepôt of a considerable trade. Pop. 6858.

Sebes'ten, the *Cordia myxa* and *latifolia,* Asiatic trees of the borage order. The fruit is edible, and was formerly employed in European medicine, but now only by the practitioners of the East. It is mucilaginous and somewhat astringent.

Seca'le, the genus which contains rye.

Secamo'ne, a genus of plants, natural order Asclepiadaceæ, found in the warm parts of India, Africa, and Australia. The species form erect or climbing smooth shrubs, and some of them secrete an acrid principle which makes them useful in medicine. The roots of *S. emetica* are employed as a substitute for ipecacuanha.

Se'cant, in trigonometry, a straight line drawn from the centre of a circle, which, cutting the circumference, proceeds till it meets with a tangent to the same circle; as the line ACB in the figure, which is a secant to the arc CD. In the higher geometry it signifies the straight line which cuts a curve in two or more points.



Secchi (sek'kē), ANGELO, Italian astronomer, was born at Reggio in Lombardy, June 29, 1818; entered the order of Jesuits in 1833, and in 1849 was appointed director of the observatory of the Collegio Romano at Rome, a post which he held till his death, Feb. 26, 1878. Father Secchi

gained a great reputation by his astronomical researches, especially by his meteorological observations and spectroscopic analyses both of stars and of the sun. His three most popular works are l'Unité des Forces Physiques (1869), Le Soleil (The Sun; 1870), and Le Stelle (The Stars; 1879).

Secession Church, in Scottish ecclesiastical history, a body of Presbyterians who in 1733 withdrew from the Established Church on account of the toleration of certain alleged errors in doctrine, the evils of patronage, and general laxity in discipline. In 1747 this body divided on the question of the lawfulness of certain oaths, especially the burgess oath necessary to be sworn previous to holding office or becoming a freeman in some burghs, those maintaining the lawfulness of this oath being called Burghers, and those denying it Anti-burghers; but the two divisions reunited in 1820 under the designation of The United Associate Synod of the Secession Church, the chief ground of difference (the burgess oath) having been by that time removed. The separate existence of the Secession Church terminated in 1847, when it became merged in the United Presbyterian Church, a body formed by the union of the Secession with the Relief Church. See *United Presbyterian Church*.

Secessionist, in the United States, one who maintains the right of a state included under the constitution of the United States to withdraw from the Union and set up an independent government; specifically, one who took part or sympathized with the inhabitants of the Southern States in their struggle, commencing in 1861, to break away from union with the Northern States.

Sechuen. See *Sze-chuen*.

Seck'endorf, FRIEDRICH HEINRICH, COUNT VON, imperial field-marshal, born in 1673 at Königsberg, in Franconia; died 1763. After studying law at Jena, Leipzig, and Leyden, he adopted the military profession, and served against the Turks under Prince Eugene, and in the war of the Spanish Succession. On the death of Prince Eugene, 1736, he became commander-in-chief of the Austrian army against the Turks, but being unsuccessful, was recalled, tried by court-martial, and imprisoned in the fortress of Gratz, from which he was liberated in 1740. He then took service with the elector of Bavaria, who had just been elected as Charles VII., emperor of Germany, and as commander of the Bavarian forces relieved Munich and drove back the Austrians into Bohemia. On the emperor's death in 1745 he himself set negotiations on foot for establishing a peace; whereupon he was re-established by the new emperor Francis I., husband of Maria Theresa, in all the honours he had at an early period obtained.

Second, in the measurement of time and of angles, the 60th part of a minute; that is, the second division next to the hour or degree. In old treatises seconds were distinguished as *minutæ secundæ*, from *minutæ primæ*, minutes.

Second, in military affairs, to put into temporary retirement, as an officer when he accepts civil employment under the crown. After six months of such employment he is seconded, that is, retaining his rank he loses his military pay. After being seconded for ten years he must elect to return to military duty, permanently retire, or resign his commission.

Secondary Formations, in geology, the Mesozoic strata, midway, in ascending order, between the Primary or Palæozoic below and the Tertiary or Kainozoic above. They range from the top of the Permian Formation to the base of the Eocene, and include, therefore, the Triaa, Lias, Oolitic, and Cretaceous Formations.

Second Sight (in Gaelic, *taisch*), a Highland superstition, formerly very common, which supposed certain persons endowed with the power of seeing future or distant events as if actually present. These visions were believed to be not as a rule voluntary, but were said to be rather dreaded than otherwise by those who were subject to them; yet it was also believed that those who possessed this gift might sometimes induce visions by the performance of certain awful rites. The subject is treated at length in Martin's Description of the Western Islands of Scotland (1703); Macleod of Hamir's Treatise on the Second Sight (1763); and is discussed also in Dr. Johnson's Journey to the Hebrides (1775).

Secret, in the Roman Catholic Church, the prayer of the mass which follows immediately after the oblation of the bread and wine, and which is recited by the priest in so low a voice as not to be heard by the people.

Secretary-bird, the sole representative of the genus *Serpentarius* (*S. secretarius*, also called *Gypogerānus serpentarius*), order Accipitres or birds of prey. It derives its popular name from the peculiar plumes of feathers which project from the back and

sides of its head, and give it the appearance of having bundles of pens stuck behind each ear. It has very long legs, and stands nearly 4 feet in height. The wings are elongated, and carry a blunt spur on the shoulder, the third, fourth, and fifth quills being the longest. The tail is also very long,

Secretary-bird (*Serpentarius secretarius*).

and wedge-shaped, the two middle feathers projecting beyond the others. The tibiæ are feathered all the way down. The skin around the eyes is destitute of feathers. The general colour is a slaty gray, the pen-like feathers of the head being black, as also are the feathers of the tibiæ and the primaries of the wings. The secretary-bird can fly with ease when once it takes wing, but it seems to prefer the ground. It is found over the greater part of Africa, especially in the south. It derives its generic name from its habits of destroying serpents, striking them with its knobbed wings and kicking forward at them with its feet until they are stunned, and then swallowing them. As a foe to venomous snakes it is encouraged and protected in South Africa, where it is frequently brought up tame.

Secretary of State, an officer whose business is to superintend and manage the affairs of a particular department of government. There are connected with the British government five secretaries of state, viz. those for the home, foreign, colonial, war, and Indian departments. The *secretary of state for the home department* has charge of the privy signet office; he is responsible for the internal administration of justice, the maintenance of peace in the country, the supervision of prisons, police, sanitary affairs, &c. (See *Home Department.*) The *secretary for foreign affairs* conducts all correspondence with foreign states, negotiates treaties, appoints ambassadors, &c. (See *Foreign Office.*) The *colonial secretary* performs for the colonial dependencies similar functions to those of the home secretary for the United Kingdom. The *secretary for war*, assisted by the commander-in-chief, has the whole control of the army. The *secretary for India* governs the affairs of that country with the assistance of a council. Each secretary of state is assisted by two under-secretaries, one permanent and the other connected with the administration. The *chief secretary for Ireland* is not a secretary of state, though his office entails the performance of similar duties to those performed by the secretaries of state. In 1885 the office of *secretary for Scotland* was revived; he exercises in Scotland many of the powers and duties of the secretary for the home department, but has no cabinet rank by virtue of his office.—The *secretary to the admiralty* is a subordinate member of the government, always a member of the House of Commons, in which he represents the admiralty when the first lord of the admiralty is a peer. A *secretary of embassy*, or of *legation*, is the principal assistant of an ambassador or envoy.

Secretion, in animal physiology, is the separation of certain elements of the blood, and their elaboration to form special fluids, differing from the blood itself or from any of its constituents, as bile, saliva, mucus, urine, &c. Secretion is performed by organs of various form and structure, but the most general are those called glands. Of these glands the essentially active parts are the cells, which elaborate from the blood a peculiar fluid in each instance predetermined by the inherent function of the gland or organ of which the cells are integral parts. The chief general conditions which variously affect secretion are the quantity and quality of the blood traversing the gland and the influence of the nervous system. Mental conditions alone, without material stimuli, will excite or suppress secretion; but this is a branch of the subject which is yet ill-understood. Animal secretions have been arranged into—(1) *Exhalations*, which are either external, as those from the skin and mucous membrane, or internal, as those from the surfaces of the closed cavities of the body and from the lungs; (2) *Follicular secretions*, which are divided into mucous and cutaneous; and (3) *Glandular secretions*, such as milk, bile, urine, saliva, tears, &c.

Secretion, in vegetable physiology, is the separation of certain elements from the sap, and their elaboration by particular organs. These secretions are exceedingly numerous,

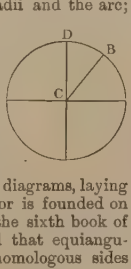
and constitute the great bulk of the solid parts of plants. They have been divided into (1) *General* or *nutritious secretions*, the component parts of which are gum, sugar, starch, lignin, albumen, and gluten; and (2) *Special* or *non-assimilable secretions*, which may be arranged under the heads of acids, alkalies, neutral principles, resinous principles, colouring matters, milks, oils, &c.

Secret Writing. See *Cryptography.*

Secrole (si-krōl'). See *Sikraul.*

Section, a representation of a building or other object as it would appear if cut through by an intersecting plane, showing the internal structure.

Sector, in geometry, a part of a circle comprehended between two radii and the arc; a mixed triangle, formed by two radii and the arc of a circle; as C D B in the accompanying figure. The term denotes also a mathematical instrument so marked with lines of sines, tangents, secants, chords, &c., as to fit all radii and scales, and useful in making diagrams, laying down plans, &c. The sector is founded on the fourth proposition of the sixth book of Euclid, where it is proved that equiangular triangles have their homologous sides proportional.



Secular Clergy, in the Roman Catholic Church, clergy of all ranks and orders not bound by monastic vows. See *Regular Clergy.*

Secular Games, a great festival, probably of Etruscan origin, anciently celebrated at Rome to mark the commencement of a new *sæculum* or generation. In 249 B.C. it was decreed that the secular games should be celebrated every hundredth year after that date; but this decree was frequently disregarded, and they were celebrated at very irregular intervals.

Secularism, a philosophy of life, the gist of which consists in the advocacy of free thought and the assertion of some corollaries derived from this leading tenet. Secularists are convinced that the best means of arriving at the truth is to place perfect confidence in the operations of human reason. They do not hold human reason to be infallible, but they maintain that it is in the interest of truth that reason should be corrected only by reason, and that no restraint whatever, penal, moral, or social, should be placed upon holding, expressing, or acting up to any opinion intelligently formed and sincerely held, however contrary that opinion may be to those generally current. Scepticism or the questioning of traditional beliefs they regard as a moral duty, yet their creed cannot be called a sceptical one, for they do not rest satisfied with doubting, but when they find that certainty, that is, irresistible conviction, is unattainable on any subject, they consider that they should confess their ignorance with regard to it, and pass on to other subjects that may be investigated with more profitable results. From the nature of their leading tenet it follows that the only moral principles they can hold are such as they believe must commend themselves to the reason and aspiration of every man of enlightened conscience. The foundation of such a set of moral principles they profess to find in the doctrine of Utilitarianism, which regards it as our highest duty to do all that tends to bring every individual to the highest perfection of which human nature is capable. The means to do this is, they think, most likely to be found in the study of man's whole nature, physical, moral, and intellectual, and of the laws of external nature, and these are the objects to which they direct attention. Secularism does not come into direct collision with any religion. It is not atheistic, inasmuch as it is no tenet of that system either to affirm or deny the existence of God; nor does it deny the truth of Christianity, for that is none of its business any more than it is to affirm or deny some scientific theory. Secularism in England is an offshoot of the socialism of Robert Owen, but its immediate founder is George Jacob Holyoake, a native of Birmingham, where he was born in 1817, and began to promulgate his views about 1846. It is to him that British legislation is chiefly indebted for the Evidence Amendment Act, which legalized affirmations in lieu of oaths. Mr. Charles Bradlaugh, Mr. Holyoake's successor in the leadership of the English secularists, carried this question a step further by his refusal to take the parliamentary oath and by the act of 1888 allowing affirmation instead.

Secularization, in its most general sense, is the conversion of objects from a religious or spiritual to a common or secular use; specifically, it is the act of rendering secular the property of the clergy. Secularization took place in Germany in 1648, and again in 1801; in England under Henry VIII.; in Italy in 1866, and again in 1873; and in France during the Revolution.

Secunderabad', or SIKANDARABAD (*Alexander's Town*), British military cantonment in India, in the Nizam's Dominion, 6 miles north-east of Hyderabad. It is the largest military station in India, covering a total area of 19 square miles, including many interspersed villages, and forms the headquarters of the Hyderabad subsidiary force, which constitutes a division of the Indian army. Pop. 74,000.

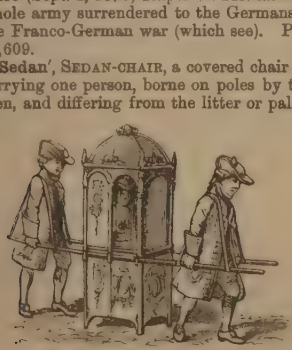
Secundra. See *Sikandra.*

Sedaine (sė-dān), MICHEL JEAN, French dramatist, born at Paris 1719, died 1797. He is regarded as the founder of comic opera. Two of his comedies, Le Philosophe sans le Savoir and La Gageure Imprévue, still hold the stage, and are ranked among the best French plays.

Seda'lia, a town of the United States, capital of Pettis county, Missouri, 189 miles west of St. Louis, is a railroad centre and the seat of the machine-shops and carriage-factories of two railroad companies. Pop. 14,068.

Sedan (sė-dān), a town in France, department of Ardennes, on the Meuse, on the frontiers of Luxemburg. The staple industry is the manufacture of fine black cloth. Here (Sept. 2, 1870) Napoleon III. and his whole army surrendered to the Germans in the Franco-German war (which see). Pop. 16,609.

Sedan', SEDAN-CHAIR, a covered chair for carrying one person, borne on poles by two men, and differing from the litter or palan-



Sedan-chair, time of George II.

quin in that the traveller was carried in a sitting posture. It is said to have taken its name from the town of Sedan in France. It was introduced into England in 1581, and was very fashionable during the reigns of Anne and the early Georges, but disappeared at the beginning of the 19th century, on the introduction of the cab.

Se'datives, medicines that moderate the excessive action of an organ or organic system. Digitalis, for example, is a sedative of the action of the heart and the circulatory system; and gum-resins are sedatives that act on the nervous system. Besides these aconite, chloroform, conium, carbonic acid, and prussic acid are among the principal sedatives.

Sedge (*Carex;* natural order, Cyperaceæ), an extensive genus of grass-like plants, containing thousands of species, mostly inhabiting the northern and temperate parts of the globe. The greater proportion of the species are marsh plants. The stems are usually triangular, without joints. The sedges in general are but of little utility to man. They furnish coarse fodder, which is rejected by most of the domestic quadrupeds. The decomposed roots and leaves contribute largely to turn the soil of marshes into peat.

Sedgemoor, a marshy tract in Somersetshire, England, about 5 miles south-east of Bridgwater. In 1685 it was the scene of the battle in which the Duke of Monmouth was defeated by the troops of James II.

Sedge-warbler (*Salicaria phragmītis*), a species of insessorial bird of the warbler family, which frequents the sedgy banks of rivers, visiting Britain about the middle of April and migrating in September.

Sedgley, UPPER, a town of Staffordshire, England, 3 miles S. of Wolverhampton, of which it is practically a suburb. It has extensive collieries and iron-works, with manufactures of rivets, nails, chains, fire-irons, locks, safes, &c. Pop. 14,961.

Sedgwick, ADAM, English geologist, born at Dent, Yorkshire, in 1785; died at Trinity College, Cambridge, January 27, 1873. He was educated at Sedbergh and Trinity College, Cambridge, and in 1818 was appointed Woodwardian professor of geology in his own university, and this chair he held till within a short time of his death. His chief services to geology consisted in the determination of the geological relations of the palæozoic strata of Devon and Cornwall, and of those strata afterwards called Permian in the north-east and north-west of England, in the explanation of the geological character of North Wales, and not less in the enlargement of the geological museum at Cambridge. The only considerable work of Professor Sedgwick's is a Discourse on the Studies of the University of Cambridge, which had a wide circulation.

Sedgwick, Catherine Maria, an American writer, was the daughter of Judge Theodore Sedgwick, and was born at Stockbridge, Massachusetts, 1789; died 1867. She conducted a private school for the education of young ladies for fifty years. She published her first work of fiction, A New England Tale, in 1822, and two years later brought out Redwood, which was compared favourably with the novels of Cooper and translated into several European languages. Other works of hers were: The Traveller, Hope Leslie, Clarence, The Story of Le Bossu, The Linwoods, Letters from Abroad, Historical Sketches of the Old Painters, &c. She was a prolific writer, and contributed much to the annuals and magazines.

Sedi'lia, in architecture, stone seats in the south wall of the chancel of many cathedrals and churches. They are usually three in number, for the use of the priest, the deacon, and sub-deacon during part of the service of high mass.

Sedimentary Rocks, rocks which have been formed by materials deposited from a state of suspension in water. See *Geology.*

Sedition, a term including all offences against the crown and government which do not amount to treason, and are not capital, as seditious libels, seditious meetings, seditious conspiracies. The offences classed under the head of sedition are of the same general character with those called treason, but are without the overt acts which are essential to the latter. The punishment of sedition in Great Britain, formerly arbitrary, is now restricted to fine and imprisonment. In Scotland a distinction is made between sedition and *leasing-making,* or verbal sedition, the latter being an offence against the sovereign individually, not the government. Both offences are punished alike, namely, by fine and imprisonment.

Sedley, Sir Charles, one of the 'wits' of the Restoration period, and a great favourite with Charles II., was the son of Sir John Sedley of Aylesford, Kent, was born there in 1639, and died in 1701. He was educated at Oxford. He wrote comedies and songs; of the latter one or two are still popular, but the former are not equal to his reputation. His first comedy, The Mulberry Garden, was published in 1668. In later life he entered parliament, and took an active part in politics. He uniformly opposed the unconstitutional policy of James II., and was one of the chief promoters of the Revolution.

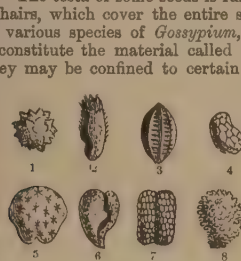
Seduction, in law, the act of persuading a female, by flattery or deception, to surrender her chastity. English law does not give a right of action either to the woman seduced or to her parents or guardians; it only gives a right of action for seduction as occasioning loss of service; but the word 'service' is interpreted with the greatest liberality, and damages are estimated not only with reference to the loss of service, but also to the distress and dishonour brought upon the woman's family by her seducer. By the law of Scotland an action for seduction is competent to a husband against the seducer of his wife, and to an unmarried woman against her own seducer, but she must show that deceit was used towards her. In neither country is seduction a criminal offence. The statutory rule which prevails widely in the United States rests both the right and remedy where the wrong is inflicted, in the family and parental relations. The action is therefore brought in the case of an unmarried woman by the parent (or guardian) as the head of the family, and in the case of a married woman by the husband.

Sedum, a genus of plants, natural order Crassulaceæ. It comprises about 120 species, mostly perennial herbs, erect or prostrate, with succulent leaves of varied form, but never compound, and with flowers usually cymose, and of a white, yellow, or pink colour. They are natives of the north temperate, and cold regions, and are often found on rocks, walls, and dry banks, where nothing else will grow, many of the species being remarkable for prolonged vitality under adverse circumstances. The British species are known by the common name of *stonecrop.* Of these the most striking are *S. Telephium* and *S. album* (white stonecrop), both used formerly in medicine, and eaten cooked or as a salad, and *S. acre* (biting stonecrop or wall-pepper), also used formerly in medicine. Many foreign species are cultivated in British gardens.

See, a word derived (through the French) from the Latin *sedes,* a seat, and properly applied to the seat or throne of a bishop, but more usually employed as the designation of the city in which a bishop has his residence, and frequently as that of the jurisdiction of a bishop, that is, as the equivalent of diocese. See *Diocese.*

Seed, the impregnated ovule of a plant. It consists essentially of two parts, namely, the nucleus or kernel, and the integuments.

The latter consists of two seed-coats—the outer named the *episperm* or *testa*, the inner the *tegmen* or *endopleura;* and the two together are sometimes termed the *spermoderm*. The testa of some seeds is furnished with hairs, which cover the entire surface, as in various species of *Gossypium*, where they constitute the material called cotton; or they may be confined to certain points



Various forms of Seeds magnified.

1, Eschscholtzia californica. 2, Corn Blue-bottle (*Centaurea Cyanus*). 3, Oxalis rosea. 4, Opium Poppy (*Papaver somniferum*). 5, Stellaria media. 6, Sweet-william (*Dianthus barbatus*). 7, Foxglove (*Digitalis purpurea*). 8, Saponaria calabrica.

of the surface, as in the willow, Epilobium, &c.; while in the pine the testa forms a wing. On the outside of the integument of the seed there is sometimes an additional partial covering, which has received the name of *aril*, and in the nutmeg forms the mace. The nucleus or kernel of the seed is the fully developed central portion of the ovule. It consists either of the embryo alone, as in the wall-flower, or of the embryo along with a separate deposit of nourishing matter called albumen, as in the cocoa-nut and wheat. The embryo is the young plant contained in the seed, and is the part to the development of which all the reproductive organs contribute. It consists of a general axis, one part of which is destined to form the root, the other to form the stem. The axial portion is provided with fleshy organs called cotyledons or seed-leaves, which serve to nurse the young plant before the appearance of the true leaves. Plants possessing one cotyledon are termed monocotyledonous, those having two are denominated dicotyledonous, and plants having only a cellular embryo, as in the cryptogamic or flowerless plants, are called acotyledonous. When seeds are contained in an ovary, as is usually the case, the plants are called *angiospermous;* when the seeds are not contained in a true ovary, with a style or stigma, the plants are called *gymnospermous*, as conifers. See *Botany*.

Seed Lac. See *Lac*.

Seeland. See *Zealand*.

Seeley, Sir John Robert, English scholar and writer, was born in 1834 in London, where his father was a publisher, and was educated at the City of London School and at Christ's College, Cambridge. He took his B.A. degree with high honours in 1857, and soon after was elected a fellow. After acting as a lecturer in his own college and as assistant classical master at his old school, in 1863 he was appointed professor of Latin in University College, London; and in 1869 he succeeded Charles Kingsley in the chair of modern history at Cambridge. In 1865 appeared a work, Ecce Homo, or the Life and Work of Jesus Christ, of which Professor Seeley has always been regarded as the author. It created a profound sensation at the time of its appearance; but Natural Religion (1887) attracted much less attention. Among Professor Seeley's avowed works are Life and Times of Stein, or Germany and Prussia in the Napoleonic Age (1879); The Expansion of England (1883); A Short Life of Napoleon the First (1886); and The Growth of British Policy (1895—posthumously); also a volume of Lectures and Essays. He was made K.C.M.G. in 1894, and died in 1895.

Seer, the standard measure of weight in India, but varying in different parts of the country. The imperial or standard seer is 2·205 lbs., exactly equivalent to the metrical kilogramme; it is the fortieth part of a maund. As a standard liquid measure the seer is equal to about 6 gills.

Se-gan Foo, the capital of the province of Shen-se, in the north-west of China. It was long the capital of the empire, and is still of great importance; silk, tea, and sugar being the principal articles of commerce. Pop. estimated at about 1,000,000.

Seggar. See *Pottery*.

Segment, in geometry, a part cut off from a circle or a sphere by a line or a plane.

Segni (sen'yē), a town of Italy, in the province and 40 miles south-east of Rome. One of the oldest Italian cities, it contains some interesting remains of antiquity, such as fragments of cyclopean walls, and an ancient gate. The cathedral is a very fine building. Pop. 5600.

Segno (sen'yō), in music, a sign placed over a note from which a portion of a piece is to be repeated.

Sego, or Segoo, the capital of a Fulah kingdom of the same name (now in the

French 'sphere of influence'), in the Bambarra country, Western Africa, on the Upper Niger. The kingdom consists mainly of an alluvial plain of great fertility on the right bank of the river, extensively flooded during the rainy season. The capital is surrounded by earth-walls, and has two-storied white mud houses with flat roofs. Pop. 30,000.

Segor'be, a town in Spain, 29 miles N.N.W. of Valencia, on the Palancia, has a cathedral, and manufactures of earthenware and paper. Pop. 7232.

Sego'via, a town in Spain, capital of the province of the same name, on a lofty rock, washed by the Eresma and Clamores, 43 miles north-west of Madrid. It is surrounded by walls flanked with round towers, and in the middle ages was a great royal and religious centre. The chief objects of interest are the ancient Alcazar or fortress, the fine Gothic cathedral, and the aqueduct of Trajan. Pop. 11,169.—The province, area 2713 square miles, is watered by streams which rise in the Guadarrama range and flow northward to the Douro. The inhabitants are for the most part employed in agricultural and pastoral pursuits. Pop. 160,111.

Seguidilla (seg-i-dēl'yà), a Spanish form of versification, consisting of four lines, generally assonant lines, of seven and five syllables alternately. It usually has a close of three verses, called *estribillo*, of which the first and last lines rhyme.

Seguin (sė-gaṇ), EDOUARD, born in France in 1812, studied medicine and surgery, devoted himself specially to the study of idiocy and the training of idiots, settled in the U. States after the revolution of 1848, and died there in 1880. He achieved remarkable results in his treatment of idiots, and his writings on the subject hold the position of text-books.

Ségur (sā-gür), JOSEPH ALEXANDRE, COMTE DE, born at Paris in 1752, died in 1805; was the author of several comedies and operas, some of which still remain popular. — His brother, LOUIS PHILIPPE, COMTE DE SÉGUR-D'AGUESSEAU, born in 1753, died in 1830; served in America under Rochambeau, and after the peace of 1783 was ambassador to St. Petersburg. In 1792 he was sent to Berlin; but after the execution of the king he retired from public affairs. In 1803 he was chosen a member of the Academy, and Napoleon appointed him one of the council of state. After the restoration he was received into the Chamber of Peers. His principal works are: Théâtre de l'Hermitage, originally written for the private theatre of Catherine II.; Tableau historique et politique de l'Europe de 1786 à 1796; Histoire Ancienne; Histoire Romaine; and Mémoires.—His son, PHILIPPE PAUL, COMTE DE SÉGUR, born 1780, died 1873, was a general of the first empire, and accompanied Napoleon I. in his Russian campaign. He wrote Histoire de Napoléon et de la Grande Armée pendant l'Année 1812 (1824); and left an extensive collection of Mémoires.

Seidlitz Powders, an aperient medicine, named after the Seidlitz spa in Bohemia. These powders are usually put up in a blue and a white paper, the blue containing tartrate of soda and potash (Rochelle salt) with bicarbonate of soda, and the white tartaric acid. The former is dissolved in half a tumbler of water, and the acid powder is then added, which produces effervescence, and the draught is taken while the effervescence is going on.

Seigniorage (sēn'yor-āj), an ancient royalty or prerogative of the crown whereby it claimed a percentage upon the bullion brought to the mint to be coined or to be exchanged for coin. No seigniorage is now charged for coining gold in Britain, but a considerable seigniorage is levied upon the silver and copper currencies.

Seine (sen or sān; ancient *Sequăna*), a river in France, which rises on the Plateau de Langres, dep. of Côte-d'Or, 20 miles north-west of Dijon. It flows generally in a north-west direction; receives on the right the Aube, Marne, and Oise, and on the left the Yonne and Eure; passes the towns of Chatillon, Troyes, Corbeil, Paris, St. Denis, St. Germain, Poissy, Mantes, Elbœuf, Rouen, Quillebœuf, and, after a somewhat tortuous course, falls into the English Channel between Honfleur and Havre. Its total length is 480 miles, and 250 miles in a direct line; and its basin has an area of about 30,000 square miles. It is navigable from its junction with the Aube at Marcilly; vessels of 9 to 10 feet draught can reach Paris, below which it has been deepened by recent works; and vessels of 20 feet draught can reach Rouen, where the navigation for sea-going ships terminates. There is a 'bore' of from 8 to 10 feet at every tide; and the estuary, which commences at Quillebœuf, is impeded by sand-banks. The Seine is connected by canals with the Loire, Saône, Scheldt, and Rhine.

Seine, a department in France, completely inclosed by the department of Seine-et-Oise, and at once the smallest and most populous of the French departments, including as it does the city of Paris. Area, 185 square miles; pop. 3,141,595. The department has 3 arrondissements (Paris, St. Denis, and Sceaux), 28 cantons (20 in Paris), and forms the archiepiscopal diocese of Paris.

Seine, SEAN (sēn), a large net for catching such fish as mackerel and pilchard. It is often 160 to 200 fathoms long, and 6 to 10 broad, and is buoyed by corks and weighted so as to float perpendicularly.

Seine-et-Marne (sen-e-märn), a French department in the basin of the Seine and Marne, east of Seine-et-Oise. Area, 2215 sq. miles; pop. 355,136. Cereals occupy two-fifths of the department, and forests (the most important of which is the forest of Fontainebleau) one-fifth. There are quarries of excellent building stone, and beds of common clay and porcelain clay, which supply the potteries of Fontainebleau and Montereau. The capital is Melun.

Seine-et-Oise (sen-e-wäz), a French department, in the basin of the Seine and Oise, inclosing the department of Seine. Area, 2163 sq. miles; pop. 618,089. Seine-et-Oise is a great agricultural and horticultural department, with numerous industrial establishments, including the national porcelain factory at Sèvres. There are valuable quarries of building stone, pavement, millstones, and extensive beds of porcelain and potters' clay. The capital is Versailles.

Seine-Inférieure (sen-aṇ-fā-ri-*eur*), a maritime department of France, on the English Channel, south of the estuary of the Seine. Area, 2330 sq. miles; pop. 833,386. The department is in general fertile and well cultivated, the principal crops being oats, wheat, and potatoes. There are numerous orchards, from which vast quantities of cider are made. Manufactures are extensively carried on, Rouen being the seat of the cotton trade and Elbœuf of the woollen trade. Havre, Rouen, and Dieppe are the principal ports for foreign trade. Tréport, Dieppe, St. Valery, Fécamp, Etretat, &c., are fashionable watering-places. The coast fisheries are productive. The capital is Rouen.

Seir-fish, a fish of the mackerel family (*Cybium Guttatum*), which occurs in East Indian seas. In size, form, and the flavour of its flesh it bears a close resemblance to the salmon.

Seisin, SEIZIN, in law, possession of the freehold. Seisin is of two sorts, seisin in deed or fact, and seisin in law. Seisin in deed or fact is actual or corporal possession; seisin in law is when something is done which the law accounts seisin, as enrolment, or when lands descend to an heir but he has not yet entered on them. The corresponding term in Scotch law is 'sasine,' which, like seisin in England, recent legislation has made of little legal importance.

Seismology (sīs-mol'o-ji), the science which treats of volcanoes and earthquakes.

Seismom'eter, an instrument for measuring the force and direction of earthquakes and other earth movements. It records both the horizontal and vertical movements by means of an index, the record being traced on smoked glass. There are various forms of seismometer or seismograph. One which is used in the observatory on Mount Vesuvius consists of a delicate electric apparatus, which is set to work by the agitation or change of level of a mercurial column, which records the time of the first shock, the interval between the shocks, and the duration of each; their nature, whether vertical or horizontal, the maximum intensity; and in the case of horizontal shocks the direction is also given.

Seistan. See *Sistan.*

Seja'nus, AELIUS, the son of a Roman knight, and noted as the favourite of Tiberius, was born at Vulsinii in Etruria. He was commander of the prætorian bands, acquired the confidence of Tiberius, and aimed at the supreme power. He contrived to remove all the members of the imperial family who stood between him and power, but having awakened the suspicion of Tiberius, he was executed in A.D. 31.

Selachii (se-lā'ki-i), that section or group of the elasmobranch fishes which specially includes the sharks and dog-fishes.

Selaginel'la, a genus of club-mosses, readily distinguished from the genus *Lycopodium* by their flat two-ranked stem. They are mostly natives of warm climates, and being often very elegant are objects of cultivation.

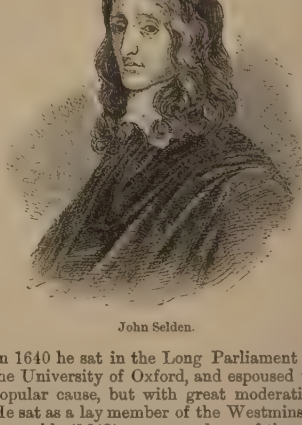
Selangor', a native state of the Malay peninsula, south of Perak, under the protection of the British colony of the Straits Settlements; area, 3500 square miles. It yields tin, gutta-percha, &c. Since 1880 the British resident resides at Kwala Lumpur, 22 miles distant from Klang, the principal port, with which it is connected by railway.

The sultan resides at Jugra. Pop. 122,000, more than half of whom are Chinese.

Selborne, Roundell Palmer, Earl of, son of the rector of Mixbury, Oxfordshire, was born there in 1812, and was educated at Rugby, Winchester, and Oxford, where he had a very brilliant career. He was called to the bar in 1837, entered parliament in 1847, became solicitor-general in 1861, attorney-general in 1863, and was lord-chancellor 1872–74 and 1880–85. He was created Baron Selborne of Selborne, Hampshire, in 1872, and Earl of Selborne in 1882. In 1886 he refused to join the cabinet owing to disapproval of Mr. Gladstone's Irish policy. He took an active interest in church matters, published a collection of hymns, and wrote A Defence of the Church of England (1886), and Churches and Tithes (1887). He died in 1895.

Selby, a market town of England, in the West Riding of Yorkshire, 14 miles south of York, on the Ouse, here navigable for vessels of 200 tons; has excellent communications by railway and canal, and is the seat of a considerable trade and of a number of miscellaneous manufactures. The magnificent parish church formed part of an abbey of Benedictine monks, founded in 1068 by William the Conqueror. Pop. 6046.

Selden, John, a distinguished jurist, legal antiquary, and Oriental scholar, was born 1584 at Salvington, near Worthing, Sussex, where his father held a small farm, and was educated at the free grammar-school, Chichester, and at Hart Hall, Oxford, whence he proceeded to London to Clement's Inn and the Inner Temple. On being called to the bar he practised principally as a chamber counsel, devoting his leisure to the study of constitutional history. The fruits of his studies he gave to the world in several valuable works, including the Analecton Anglo-Britannicon, a treatise on the civil government of Britain before the coming of the Normans; Janus Anglorum, Facies altera (1610), a treatise on the progress of English law down to Henry II.; and Titles of Honour (1614), still a standard authority in regard to all that concerns the degrees of nobility and gentry in England. His De Diis Syriis (1617), on Syrian mythology, at once established his fame as an Oriental scholar; and his History of Tithes (1618) brought him into collision with the clergy. In 1621 he suffered a short imprisonment for having advised the House of Commons to resist King James's claim that their privileges were derived from royal grants; in 1628 he aided in drawing up the Petition of Right; and the following year he was again committed to the Tower, remaining in prison a considerable time. After his liberation he published a celebrated work, Mare Clausum (1635), upholding the rights of England to sovereignty over the 'narrow seas.'



John Selden.

In 1640 he sat in the Long Parliament for the University of Oxford, and espoused the popular cause, but with great moderation. He sat as a lay member of the Westminster Assembly (1643), was named one of the parliamentary commissioners of the admiralty (1645), subscribed the Solemn League and Covenant (1646), and was voted £5000 by parliament in recompense of his losses and as a reward for his services to the state. He died in 1654, and was buried in the Temple Church, London. His Table Talk was published in 1689 by his amanuensis, Richard Milward.

Selection, Natural. See *Natural Selection.*

Selectmen, in New England, officers chosen annually to manage the affairs of a town, provide for the poor, &c. A town has usually from three to seven selectmen, who constitute a kind of executive authority.

Sele'nē, in Greek mythology, the goddess of the moon, daughter of Hyperion, and sister of Helios (the sun) and Eos (the dawn). She was also called Phœbe, and in later times was identified with Artemis. In art she is often represented as a beautiful

woman with large wings, a long robe, and a coronet.

Sel'enite, crystallized native sulphate of calcium. See *Gypsum*.

Sele'nium, a rare chemical element discovered by Berzelius in 1817 in the refuse of a sulphuric acid manufactory near Fahlun, in Sweden. It occurs in several minerals, chiefly in combination with copper, lead, mercury, and silver, and is closely related, in its general chemical deportment, to sulphur and tellurium, these three elements forming a group which is characterized by certain well-marked general properties. Selenium takes fire when heated to a tolerably high temperature in air or in oxygen, burning with a blue flame, and with the production of the dioxide SeO_2. With hydrogen selenium forms the very disagreeably smelling gas *seleniuretted hydrogen* (H_2Se), the analogue of sulphuretted hydrogen. To selenium the symbol Se and the atomic weight 96·5 are given.

Seleu'cia, the name of several cities in Asia, founded by Seleucus Nicator. The most celebrated was Seleucia-on-the-Tigris, the eastern capital of the Seleucidæ, about 30 miles from Babylon. It was one of the richest commercial cities of ancient times, counting about 600,000 inhabitants, chiefly Greeks. Taken by the Parthians 140 B.C., and sacked by Trajan 116 A.D., it was soon deserted, and became as desolate as Babylon itself. The next in importance was Seleucia Pieria, founded 300 B.C., and situated on the sea-coast at the foot of Mount Pieria, 12 miles west of Antioch, of which it was the seaport, and which it rivalled in splendour.

Seleu'cidæ, a dynasty of kings who succeeded to that portion of the empire of Alexander the Great which embraced the Asiatic provinces, and is generally known as Syria.—SELEUCUS I., surnamed *Nicator*, the founder of the line, was born about 358 B.C., and was a general of Alexander the Great, shortly after whose death (323 B.C.) he obtained the satrapy of Babylon. Subsequently Antigonus forced him to withdraw into Egypt (316 B.C.), but having induced Ptolemy, the governor of Egypt, along with Lysimachus and Cassander, to take the field against Antigonus, he was enabled to return to Babylon in 312 B.C. He gradually extended his possessions from the Euphrates to the Indus, assumed the title of king in 306, and latterly acquired Syria and the whole of Asia Minor, but was assassinated in 280 B.C. He is said to have been the most upright of Alexander's successors, and was the founder of Antioch and other cities. He was succeeded by his son Antiochus I. and by a number of monarchs of the name of Seleucus and Antiochus, the most distinguished being Antiochus the Great. (See *Antiochus*.) The power of the Seleucidæ began to decline as early as the reign of Seleucus II. (246–226 B.C.), and they successively lost, through revolts and otherwise, Bactria, Parthia, Armenia, Judea, &c., and what subsequently remained was converted into a Roman province in 65 B.C.

Selim I., Sultan of Turkey, was the son of Bajazet II., born in 1467, died 1520. The people, pleased with his warlike disposition, raised him to the throne in place of Bajazet, who was afterwards poisoned, as were also the brothers and nephews of Selim. In 1514 he entered upon a war with Persia and obtained large accessions of territory. He next directed his arms against the Mamelukes of Egypt, and in 1516–17 became master of Syria and Egypt. The title of *imam* and the standard of the Prophet were at this time granted to Selim by the last descendant of the Abasside Caliphs in Egypt, and in consequence the sultans of Constantinople became the chiefs of Islam, the representatives of Mohammed. Selim was succeeded on the throne by Solyman I.

Selim III., Sultan of Turkey, son of Mustapha III., was born 1761, assassinated 1808. He succeeded his uncle Abdul-Hamed in 1789, and attempted reforms in his government after European methods, but wars with Russia, Austria, &c., prevented their being carried out. In 1791 Selim was compelled to cede Choczim to Austria, and a year later he signed the Peace of Jassy, by which Russia acquired all Turkish possessions beyond the Dniester. Selim entered with great ardour upon his system of reforms; but the fanatic zeal of the people, kindled by the preaching of the dervishes, burst into open revolt, and he was deposed by the Janizaries (1807). An attempt to regain his throne ended in his murder. Selim's efforts for the reformation of Turkey were not altogether fruitless, for manufactures had begun to flourish, and generally a number of improvements calculated greatly to benefit the nation effected.

Seli'nus, one of the most important of the Greek colonies in Sicily, founded probably about 628 B.C. on the south-western coast of that island. Thucydides mentions its great power and wealth, and the rich treasures

of its temples. It was conquered by the Carthaginians in 409, and in 249 destroyed by them. There are still important ruins of ancient Greek temples here, and valuable sculptures belonging to them have been preserved.

Seljuks, a Turkish family deriving its name from Seljuk, chief of a small Turkish tribe which had gained possession of Bokhara and the adjoining neighbourhood in the 9th century of our era. The most powerful of the various dynasties they founded in Mesopotamia, Persia, Syria, and Asia Minor during the 11th and 12th centuries were:—(1) The Seljuks of Iran or Bagdad, and Ispahan. The founder, Togrul-Beg, grandson of Seljuk, completed the conquest of Persia about 1061. His notable successors were Alp-Arslan (1063–73), Melek-Shah (1073–93), Mohammed-Shah (1105–18), and Sanjar (1118–58). This dynasty became extinct in 1194 with Togrul-Shah, who was vanquished by Tekesh, sultan of Kharizm.—(2) The Seljuks of Kerman, who ruled the three provinces of Kerman. Their dynasty, founded by Kaderd, nephew of Togrul-Beg, ended in 1091.—(3) The Seljuks of Aleppo, in Syria, founded in 1079, and became extinct in 1114.—(4) The Seljuks of Damascus, founded in 1096 by Dekkah. His successors reigned till 1155.—(5) The Seljuks of Iconium, or of Asia Minor, founded by Solyman-ben-Kutulmish, who was granted a territory in Asia Minor by the Sultan Kalek-Shah. During the reign of Alla-ed-Din II., one of the last princes of this dynasty, the Turk Osman distinguished himself as chief captain. His descendants founded the dynasty of Osman in Asia Minor. The Seljuk Empire now fell under Mongol domination. See *Ottoman Empire*.

Selkirk, a royal and parliamentary burgh in Scotland, and county-town of Selkirkshire, on an eminence overlooking Ettrick Water, 39½ miles S.S.E. of Edinburgh. It is substantially built, and has a town-hall, and monuments to Sir Walter Scott and Mungo Park. The staple industry is the manufacture of tweeds. In the vicinity is Philiphaugh, where the Covenanters under Leslie routed the forces of Charles I. under Montrose. Selkirk, with Hawick and Galashiels, returns a member to parliament. Pop. 5788.—**Selkirk**, or **Selkirkshire** (formerly known as *Ettrick Forest*), is an inland county, bounded by Midlothian, Roxburgh, Dumfries, and Peebles; area, 164,545 acres. It is generally hilly, with heights ranging from a few hundreds to 2000 feet, and affording excellent pasturage. The arable land occupies about one-eighth of the area, and produces the ordinary cereals and green crops. Large numbers of sheep are reared, the Cheviots being now the prevailing breed. The chief river is the Tweed, with its tributaries Ettrick and Yarrow. Among interesting historical scenes in the county are the field of Philiphaugh; Oakwood Towers, the reputed residence of Michael Scott, the wizard; and Newark Castle, the scene of Scott's Lay of the last Minstrel. Other places of interest are St. Mary's Loch and the Loch of the Lowes, midway between which is the monument to the Ettrick Shepherd. Woollens are largely manufactured, chiefly in Selkirk, the capital of the county, and in Galashiels. Selkirkshire, together with Peeblesshire, returns one member to parliament. Pop. 27,349.

Selkirk, or **Selcraig**, **Alexander**, the prototype of 'Robinson Crusoe,' was born in Largo, Fifeshire, in 1676; died on board the royal ship *Weymouth*, 1723. He took part in bucaneering expeditions in the South Seas, and in consequence of a quarrel with his captain he was put ashore, at his own request, on the island of Juan Fernandez. There he lived alone for four years and four months, when he was taken off by the captain of a privateer. He returned home in 1712, and his adventures became known to the public. Defoe's Robinson Crusoe appeared in 1719, but Crusoe's experiences have but little in common with those of Selkirk. Selkirk afterwards rose to the rank of lieutenant in the navy. A monument was erected to him in his native town in 1885.

Selma, a city of the United States, Dallas county, Alabama, on the Alabama river, 95 miles below Montgomery. It has mills and various manufactories. During the civil war it was an important military station, and was taken by the Federals in April 1865. Pop. 7529.

Selters (or **Seltzer**) **Water**, a mineral water found naturally in the village of Niederselters, in the German province of Hesse-Nassau, and elsewhere, but also largely manufactured. Its chief ingredients are carbonic acid, carbonate of soda, and common salt. It acts as a mild stimulant of the mucous membranes, and as a diuretic.

Selvas, or **Silvas**, great tracts of low flat land, covered with dense vegetation and

forest trees, which occur along the course of the river Amazon in South America.

Sem'aphore (Greek, *sēma*, a signal, and *pherō*, I bear), a term originally applied to telegraphic or signalling machines the action of which depended upon the motion of arms round pivots placed at or near their extremities. Many kinds of semaphores were in use before the invention of the electric telegraph, and a simple form is still employed on railways to regulate traffic at or near stations.

Semaphore Plant. See *Moving Plant.*

Semecarpus, a small genus of Asiatic and Australian trees, nat. order Anacardiaceæ. See *Marking-nut.*

Semele (sem'e-lē), in Greek mythology, a daughter of Cadmus by Harmonia, and beloved by Zeus. Jealous of her husband's mistresses, Hera persuaded Semele to entreat her lover to attend her with the same majesty as he approached Hera. As he had sworn to gratify her every wish, Zeus, though horrified at this request, came to her accompanied by lightnings and thunderbolts, when Semele was instantly consumed by fire. Dionysus (Bacchus) was her son by Zeus.

Semen'dria, or SMEDEREVO, a town in Servia, on the Danube, 22 miles S.E. of Belgrade. It is imperfectly fortified, poorly built, and rendered unhealthy by the proximity of swamps. Pop. 6578.

Sem'ibreve, in music, a note of half the duration or time of the breve. The semibreve is the measure note by which all others are now regulated. It is equivalent in time to two minims, or four crotchets, or eight quavers, or sixteen semiquavers, or thirty-two demi-semiquavers. See *Music.*

Sem'icolon, in grammar and punctuation, the point (;), the mark of a pause to be observed in reading or speaking, of less duration than the colon, and more than that of the comma. It is used to distinguish the conjunct members of a sentence.

Sem'inoles, a tribe of North American Indians, an offshoot from the Choctaw Muskogees. They separated from the Confederation of the Creeks, and settled in Florida in 1750, under the name of Seminoles, that is, fugitives. They were subsequently joined by other Indians as well as negroes, and in 1822 they numbered 3900 souls. As a punishment for their continual plundering and murdering of the white settlers, General Jackson was sent against them in 1818. They latterly sold their lands and agreed to be transferred beyond the Mississippi, but refused to implement their agreement, and under their chief Osceola carried on a long and determined resistance. At last they were finally driven from the Everglade morasses by U. States troops, and obliged to succumb in 1842, when all but a scanty remnant were transferred to the Indian Territory, where they now form an industrious community.

Semipalatinsk, or SEMIPOLATINSK, a fortified town of Siberia, on the Irtish. It consists chiefly of wooden buildings facing the river, and carries on a considerable trade with the Kirghiz and with Tashkend Khokand, Bokhara, and Kashgar. Pop. 14,198.—The province of Semipalatinsk has an area of 198,192 square miles, and a population of 525,979, chiefly Kirghiz, Cossacks, &c. It is mountainous in the south-east, consists of steppe land in the north-west, and is one of the warmest regions of Russian Asia in summer, though the winter is rather extreme. The chief occupation of the people is cattle-rearing.

Semiquaver, in music, a note half the length of the quaver. See *Music.*

Semir'amis, a queen of Assyria, whose history is enveloped in fable. As the story goes, she was a daughter of the fish-goddess Derceto of Ascalon, in Syria, by a Syrian youth. Being exposed by her mother, she was miraculously fed by doves until discovered by the chief of the royal shepherds, who adopted her. Attracted by her beauty, Onnes, governor of Nineveh, married her. She accompanied him to the siege of Bactra, where, by her advice, she assisted the king's operations. She became endeared to Ninus, the founder of Nineveh (about B.C. 2182), but Onnes refused to yield her, and being threatened by Ninus, hanged himself. Ninus resigned the crown to Semiramis, and had her proclaimed queen of Assyria. She built Babylon, and rendered it the mightiest city in the world. She was distinguished as a warrior, and conquered many of the adjacent countries. Having been completely defeated on the Indus, she was either killed or compelled to abdicate by her son Ninyas, after reigning forty-two years. According to popular legend she disappeared or was changed into a dove, and was worshipped as a divinity. Her whole history resembles an oriental tale, and even her existence has been questioned. She is probably a mythological being corresponding to Astarte, or the Greek Aphroditē.

Semiretchinsk', a province of Russian Turkestan close to the Chinese frontier; area 155,300 square miles. It is mountainous in the south, but the northern part is flat and barren. Large herds of cattle are reared by the inhabitants, and agriculture is more or less developed in the southern district. Pop. 750,000.—The chief town is VERNOYE, which has an increasing trade with Kuldja and Kashgar. Pop. 12,000.

Semit'ic Languages, the languages belonging to the Semites or Semitic peoples, that is those regarded as descendants of Shem. The Semitic languages form an important linguistic family, which is usually divided into a northern and a southern section. To the northern belong the ancient dialects of Assyria and Babylonia (recovered by means of the cuneiform inscriptions); the Hebrew, with the Samaritan and Moabitic; the Phœnician and Carthaginian; and lastly the Aramaic, which includes the Chaldee and the Syriac. The northern Semitic languages are now almost entirely extinct as spoken tongues, though Hebrew is to some extent still used in writing. The most important of the south Semitic tongues, and the only one now in extensive use, is the Arabic, which as a spoken language may be divided into the four dialects of Arabia, Syria, Egypt, and Barbary. To this branch also belong the Himyaritic, formerly spoken in part of Arabia, the Ethiopic, or ancient ecclesiastical language of Abyssinia, and the Amharic and other modern dialects of the same country. The most prominent characteristic of the Semitic tongues is the triliteralism of their roots, that is, the peculiarity that their roots regularly consist of three consonants which always remain unchanged, the various words and word forms being produced by the insertion of vowels between the consonants of the root. Another peculiarity is the absence of compound words. See *Philology*.

Semlin, a frontier town of Hungary, near the junction of the Save and Danube, and almost opposite the Servian city of Belgrade. It carries on an important transit trade. Pop. 11,836.

Semmering, a mountain of Austria, 4575 feet high, on the borders of Styria and Lower Austria, 44 miles S.W. of Vienna. It is crossed by the Semmering Railway, the first of the mountain railways in Europe. The railway is carried along the face of precipices, through fifteen tunnels, and over sixteen viaducts, the surrounding scenery being magnificent. It was constructed at a cost of £2,000,000 for the Austrian government, between 1848 and 1853.

Semmes, RAPHAEL, American naval officer, born 1809, died 1877. He entered the navy in 1832, having previously studied law; took part in the Mexican war, and on the outbreak of the civil war joined the Confederate service, and gained much prominence from his feats in command of the *Sumter* and the *Alabama*. (See *Alabama*.) He was imprisoned after the war, but gained his liberty at the amnesty. The rest of his life was devoted to law practice. He was the author of Service Afloat and Ashore, Cruise of the *Alabama* and *Sumter*, &c.

Semnopithe'cus, a genus of Old World monkeys, to which belong the Entellus monkey (*Semnopithēcus Entellus*) and the proboscis monkey (*S.* or *P. larvātus*).

Semoli'na, a term applied to a kind of wheat-meal in large hard grains, used for making puddings, thickening soup, &c. In grinding, the millstones are so adjusted as to leave the product in a granular form and not reduced to a state of flour. The hard wheats of Southern Europe are best adapted for this purpose.

Sempach (zem'pàh), a village of Switzerland, in the canton and 8 miles north-west of Lucerne, on the Lake of Sempach (3½ miles long). It is remarkable as being the scene of a great victory which the Swiss gained over the Austrians under Duke Leopold, who was slain together with 600 nobles and upwards of 2000 troops. Pop. 1183.

Sempervi'vum. See *Houseleek*.

Senaar'. See *Sennaar*.

Senate, originally the supreme legislative body of ancient Rome, first instituted according to tradition by Romulus. Tarquinius Priscus is said to have increased the number of members from 100 to 300, thus making 100 representatives for each of the Patrician *tribes*. Under the republic the consuls, consular tribunes, and later the censors, had the power of choosing the senators; but they were restricted to those who had previously held magistracies, and as the magistrates were chosen by popular election the senate was ultimately a representative body. Curule magistrates and quæstors had a seat *ex officio* in the senate, and a right to speak, but not to vote. In the administration of affairs the senate was supreme, and during national crises could invest the consuls with absolute and dictatorial authority.

A decree of the senate was called *senatus consultum*. The number of senators necessary to form a quorum during the republic is uncertain. After this body had remained for several centuries at 300, their number was raised by Sulla to 600, he having added 300 equites to the senate. Julius Cæsar made a further increase of 300, and at one time there were 1000, but Augustus lowered their number to 600, and required the presence of 400 to constitute a full assembly. He afterwards further reduced them, and later 70 members were considered sufficient. The majority of votes always decided a question. Latterly, under the republic, the tribunes of the people could veto every proposition before the senate. Under the emperors the senate gradually lost its political consideration; finally it often accepted and passed the imperial decrees without deliberation. In modern times the term is applied to the upper or less numerous branch of a legislature in various countries, as in France, in the United States, in most of the separate states of the Union, and in some of the Swiss cantons. It is also used to designate the governing body of certain universities.

Sen'eca, a lake in the western part of New York State, 25 miles S. of Lake Ontario, into which its waters flow. It is about 37 miles long, from 2 to 4 miles broad, and 630 feet deep. It communicates with the Erie Canal, and steamers ply upon it.

Sen'eca, LUCIUS ANNÆUS, called Seneca the philosopher, son of the following, was born at Corduba (Cordova) A.D. 3. When quite young he went to Rome, where he made rapid advances in knowledge under the tuition of his father, and also studiously pursued the Stoic philosophy. One of his best treatises, Consolatio ad Helviam (a letter of consolation addressed to his mother), and also Consolatio ad Polybium (a letter consoling Polybius on the loss of his brother), were written in Corsica, whither he was banished in A.D. 41, being accused, through the jealousy of Messalina, of undue intimacy with Julia, a niece of the Emperor Claudius. He was recalled in 49, made prætor, and appointed joint-tutor with Burrhus of the young Domitius, afterwards the Emperor Nero. The good government of the first years of Nero's reign was largely due to Seneca (though Seneca had consented to the assassination of Nero's mother), but he lost his influence, and being accused of complicity in the conspiracy of Piso he was forced to commit suicide (A.D. 66). His works comprise treatises on Anger; On Providence; On Tranquillity of Mind; On the Steadfastness of the Wise Man; On Clemency, addressed to Nero; seven books On Benefits; seven on investigations of nature; and twenty books of moral letters. The tragedies which bear Seneca's name are very inferior to his prose writings, and it is doubtful whether he is really the author, some of them having been attributed to his father.

Seneca, MARCUS ANNÆUS, rhetorician, and the father of the preceding, was a native of Corduba, in Spain, and was born about 61 B.C. He went to Rome during the reign of Augustus, and there taught rhetoric with great success for several years. He died at Rome towards the close of the reign of Tiberius (A.D. 37). He was the author of a collection of extracts showing the treatment of school themes by contemporary rhetoricians, but of no importance as literature.

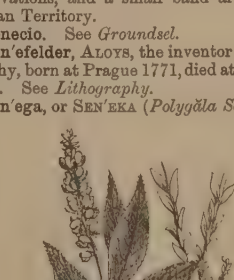
Seneca Falls, a town, Seneca co., New York, on Seneca River, which flows from Seneca Lake to Cayuga Lake. The beautiful falls on the river afford excellent water-power. Pop. 6116.

Seneca Indians, a tribe originally inhabiting the western part of New York State, and belonging to the Six Nations. They number upwards of 3000 on New York reservations, and a small band are in the Indian Territory.

Senecio. See *Groundsel.*

Sen'efelder, ALOYS, the inventor of lithography, born at Prague 1771, died at Munich 1834. See *Lithography.*

Sen'ega, or SEN'EKA (*Polygăla Senĕga*), a



Senega (*Polygăla Senĕga*).

plant belonging to the natural order Polygalaceæ, common in the U. States. It has

a woody, branched, contorted root, about ½ inch in diameter, and covered with ash-coloured bark. This has been celebrated as a cure for the bite of the rattlesnake. Medically it is considered stimulating, expectorant, and diuretic, and is now almost exclusively used in cough mixtures, being similar in its effects to squill.

Sen'egal, a river of Western Africa, which rises in the interior not far from some of the Niger sources, and after a course of some 1000 miles falls into the Atlantic near lat. 16° N. It is navigable for about 700 miles from its mouth, as far as the cataracts of Félou, beyond which its capabilities have not been ascertained. Its volume approaching the coast is greatly reduced by numerous *marigots* or channels which divert its waters through the adjacent plains, and as its mouth is dangerously barred, at most seasons the entrance of any but small craft is prevented.

Senegal, a French colonial dependency in West Africa, in Senegambia, comprising the island and town of St. Louis, at the mouth of the Senegal, several forts along the banks of that river, the island of Goree, Albuda on the Gambia, and other stations south of Cape Verd. Area (including dependencies), 140,000 square miles. The chief exports are ground-nuts, palm-oil, kola-nuts, gum, hides, wax, ivory, cabinet-woods, and gold-dust. Imports—manufactured goods, wines, spirits, and provisions. The French first settled here in 1637. It was taken by the English in 1756, retaken by the French in 1779, and subsequently held by the English till the Peace of 1814. Pop. 300,000.

Senegam'bia, an extensive region of Western Africa, comprising the countries between lat. 8° and 17° N.; lon. 4° and 17° 30′ W.; bounded N. by the Sahara, E. by Soudan, S. by Guinea, and W. by the Atlantic. The western or maritime portion of the country is a low, flat, swampy plain, from 150 to 200 miles wide. East of the country is mountainous with valleys running north and south. The chief rivers are the Senegal, the Gambia, the Rio Grande, and the Nuñez. Vegetation is luxuriant along the lower Senegal. Further south the mangrove and palm, together with the gigantic baobab, the African teak, and other large trees are seen. Rice, maize, and other grains, with bananas, manioc, and yams are grown, while the orange, citron, and other fruits introduced by the Portuguese are now extensively cultivated on the hills. Wild animals comprise the elephant, hippopotamus, monkeys, antelopes, gazelles, lion, panther, leopard, hyenas, jackal, crocodile, &c. The climate is intensely hot, and very unhealthy for Europeans. The region may be divided into French Senegambia (Senegal and territories protected or under French influence); British Senegambia (Sierra Leone, Gambia, &c.); Portuguese Senegambia (Bissao, Casamanza, &c.), and Liberia. The total population of Senegambia is estimated at 12,000,000, and its area at perhaps 700,000 square miles.

Seneschal (sen'e-shal), formerly a steward or major-domo who superintended the affairs of the household of some prince or grandee, having charge of feasts and ceremonials.

Senior, Nassau William, English political economist, born 1790. He graduated as M.A. at Oxford in 1814, and in 1819 was called to the bar at Lincoln's Inn. In 1825 he was appointed to fill the newly constituted chair of political economy at Oxford. This he resigned in 1830, but was reappointed in 1847. Of his writings mention may be made of An Outline of the Science of Political Economy (London, 1836); Political Economy (London, 1850); Essays on Fiction (London, 1864); a collection of articles on Scott, Thackeray, and others; and Historical and Philosophical Essays (two vols., London, 1865), many of the above being articles reprinted from the reviews. Senior died in 1864.

Senlis (san-lēs), a very old town in France, department of Oise, 30 miles S.E. of Beauvais. It has old walls, flanked by watch-towers; ruins of an ancient castle, the residence of French kings from Clovis to Henri IV.; and a small but handsome cathedral (end of 12th century). Pop. 5924.

Senna (*Cassia lanceolāta*).

Senna, a substance used in medicine, consisting of the leaflets of several species of *Cassia*, but the exact botanical source of some of the commercial kinds is still uncertain. Alexandrian senna is derived from *Cassia lanceolāta* and *C. obovāta*. It is grown in Nubia and Upper Egypt, and imported in large bales from Alexandria. It

is frequently adulterated with the leaves of other plants.

Sennaar', or **Senaar'**, a region of Africa, in the Soudan, area about 115,000 sq. miles, between the Bahr-el-Azrek, or Blue Nile, and the Bahr-el-Abiad, or White Nile. The country is mostly flat and sterile, but well cultivated on the river banks, where are numerous towns or villages. The population, estimated at 1,500,000, is greatly mixed. Originally an independent Negro kingdom, it was afterwards subject to Egypt, but Khartoum, the Egyptian head-quarters, and the whole country were abandoned consequent upon the Soudanese rebellion. The town of Sennaar, on the Blue Nile, with about 6000 inhabitants, has a fairly extensive trade.

Sennach'erib, an Assyrian king, son of Sargon, whom he succeeded B.C. 705. He suppressed the revolt of Babylonia, and marched against the Aramæan tribes on the Tigris and Euphrates, of whom he took 200,000 captive. He then reduced part of Media; rendered tributary Tyre, Aradus, and other Phœnician cities; advanced upon Philistia and Egypt, and finally proceeded against Hezekiah, king of Judah, who had revolted. Yielding to panic Hezekiah paid the tribute exacted of 300 talents of silver and 30 talents of gold. On his return to Assyria Sennacherib again attacked Babylonia and afterwards reinvaded Judah. Having marched through Palestine he besieged Libnah and Lachish, and wrote a threatening letter to Hezekiah; but in consequence of a miraculous visitation, which caused the death of 185,000 of his troops, Sennacherib returned to Nineveh and troubled Judah no more. From Herodotus we learn an Egyptian tradition regarding the destruction of Sennacherib's host, but no mention of it is found in the monuments of Sennacherib. The greatest architectural work of Sennacherib was the palace of Koyunjik, which covered fully 8 acres. Of the death of Sennacherib nothing is known beyond the brief Scripture statement of 2 Kings xix. 37 and Isa. xxxvii. 38, from which it appears that he was murdered by his own sons, Adrammelech and Sharezer (681 B.C.).

Senones (sen'o-nēz), an ancient tribe of Gauls, who were settled on the river Yonne. The chief town of this tribe was the Sens of to-day.

Sens (sãns), a town of France, department of Yonne, on the right bank of the Yonne, 31 miles N.N.W. of Auxerre. It is surrounded with old walls, partly Roman, and entered by several ancient gates; is well built, and has a fine early Gothic cathedral and various manufactories. Pop. 12,679.

Sensation, the name applied to indicate the consciousness of an impression produced on sensory nerve fibres. (See *Nerve.*) An impression might be produced upon a sensory nerve and transmitted to a nerve-centre, leading to stimulation of the centre and to some subsequent change, but if no consciousness of such existed it could not be called a sensation. Thus, an impression made on an organ of sense might reach a lower nerve-centre, and by reflex action induce a muscular movement, while the centres devoted to consciousness being asleep or preoccupied remained unaffected. To this kind of impression the term sensation is not applicable. The external organs by means of which particular kinds of impressions are primarily received, and thence transmitted to the brain, are called the organs of the senses; these are the eye, the ear, the nose, and the tongue, besides the nerves dispersed under the common integument, which give rise to the common sensation feeling or touch. This last is of a more general kind than the others, making us aware of heat and cold, rough and smooth, hard and soft, &c. In addition to these, according to Professor Bain, 'the feelings connected with the movements of the body, or the action of the muscles, have come to be recognized as a distinct class, differing materially from the sensations of the five senses. They have been regarded by some metaphysicians as proceeding from a sense apart, a sixth or muscular sense.' Of the sensations which are most readily perceived by animals that of *resistance* or *touch* is perhaps the most widely diffused. By the resisting feel of matter we judge of its shape and of its other attributes. Next to resistance sensibility to *heat* is the best defined and most frequently displayed sensation. The sense or consciousness of *light* or luminosity succeeds that of temperature; *taste* comes next in order; then *hearing;* whilst *smell* is probably one of the least diffused of sensations. The special senses and the structure of the organs of sense are described under the headings *Eye*, *Ear*, *Nose*, *Smell*, *Touch*, &c. (which see).

Sensationalism, in philosophy, is the theory or doctrine that all our ideas are solely derived through our senses or sensations.

Senses. See special articles *Eye, Ear, Nose, Smell, Touch,* &c.; also *Nerve, Sensation,* &c.

Sensitive Flames, gas flames which are easily affected by sounds, being by them made to lengthen out or contract, or change their form in various ways. The most sensitive flame is produced in burning gas issuing under considerable pressure from a small taper jet. Such a flame will be affected by very small noises, as the ticking of a watch held near it, or the chinking of small coins 100 feet off. The gas must be turned on so that the flame is just at the point of roaring.

Sensitive Plant (*Mimōsa pudīca;* natural order Leguminosæ), a plant celebrated for its apparent sensibility. It is a native of tropical America, but is often seen in British greenhouses. The leaves are compound, consisting of four leaves, themselves pinnated, uniting upon a common footstalk. At the approach of night the leaflets all fold together; and the common footstalk bends towards the stem; at sunrise the leaves gradually unfold, and recover their usual state. So far, this is evidently the effect of light, but the same phenomena take place on touching the plant roughly, only that it recovers itself in a short period. The same property belongs to other species of Mimosa, and to species of other genera, as the *Dionœa muscipula* (which see), &c.

Sentence, in grammar, a combination of words which is complete in itself as expressing a thought or proposition, and in writing is marked at the close by a full point. It is the unit or ground-form of speech. According to the grammars a sentence must always contain two members—the *subject* or thing spoken of, and the *predicate* or that which is enunciated regarding the subject. Accordingly every sentence must have a finite verb, though in impassioned language the verb is frequently understood. Sentences are distinguished into *simple, complex,* and *compound.* A simple sentence has only one subject and one finite verb, as 'The man is brave.' This may be more or less expanded by the use of adjuncts, and still retain its character of a simple sentence. A complex sentence is a principal sentence with one or more subordinate sentences, as 'The man, *who is truly patriotic,* will risk his life for his country.' A compound sentence consists of two or more simple sentences connected by conjunctions, as 'The sun rises in the east and sets in the west.' It differs from the complex sentence in having its clauses co-ordinate, and not, as in the other, in subordination to a principal clause.

Sentinel Crab (*Podophthalmus vigil*), a species of crab so named from its active watchful habits, and from the very elongated footstalks upon which the eyes are set. It inhabits the shores and islands of the Indian Ocean.

Sentry, or SENTINEL, a soldier set to watch or guard an army, camp, or other place from surprise, by observing and giving notice of the approach of danger. At night each sentinel is furnished with the countersign (a certain word or phrase), and no one may approach or pass him without giving this preconcerted signal.

Se'pal, in botany, one of the separate divisions of a calyx when that organ is made up of various leaves. When it consists of but one part the calyx is said to be *monosepalous;* when of two or more parts, it is said to be *di-, tri-, tetra-, pentasepalous,* &c. When of a variable and indefinite number of parts, it is said to be *polysepalous.*

s s, Sepals.

Separation. See *Judicial Separation.*

Se'pia, a genus of Cephalopoda or cuttle-fishes, included in the family Sepiadæ. These cephalopods, of which the *Sepia officinalis,* or common sepia, is a typical example, belong to the dibranchiate or 'two-gilled' section of their class, and to the group of decapoda or 'ten-armed' forms. The family Sepiadæ possesses an internal calcareous shell, the so-called *sepiostaire* or 'cuttle-fish bone,' which is often cast up upon some coasts, and was formerly in repute as an antacid in medicine, and as the source of the 'pounce' once used for spreading over eroded ink-marks to form a smooth surface for the corrected writing. There are four rows of pedunculated suckers on the arms of the genus *Sepia.* Lateral fins exist. The two tentacles or arms, which are longer than the remaining eight, possess suckers at their expanded extremities only. The eggs of the sepia resemble bunches of grapes in form, and hence are sometimes called 'sea-grapes.' The eggs are each protected in a leathery capsule. The common sepia occurs on the southern English coasts, but more especially in the Mediterranean Sea. It is

chiefly sought after on account of the inky matter which it affords. This secretion, which is insoluble in water, but extremely diffusible through it, is agitated in water to wash it, and then allowed slowly to subside, after which the water is poured off, and the black sediment is formed into cakes or sticks. When prepared with caustic lye it forms a beautiful brown colour, with a fine grain, and has given name to a species of monochrome drawing now extensively cultivated.

Sepiostaire. See *Sepia.*

Se'poys (corrupted form of *sipahis*, soldiers, from *sip*, bow or arrow, the original weapon of the Hindu soldier), the name given to the native forces in India. The native Indian army—infantry, cavalry, artillery, and sappers and miners—now numbers 145,683 men, including 2759 native officers, and 1580 European officers. Though not generally equal in courage and dexterity to European soldiers, the sepoys are hardy and endurant, and very temperate in their food.

Septa'ria, nodules or rounded lumps found in rocks. They are usually composed of clay ironstone, or limestone mixed with clay; and are distinguished by the cracks (almost always filled up with some mineral) which cross each nodule. Great numbers are found in the London clay of the Isle of Sheppey, and in the shales of coal-fields.

September (from the Latin *septem*, seven), the ninth month of our year, but the seventh of the old Roman year, which began in March. It has always contained thirty days.

Septicæmia, SEPTÆMIA (Gr. *sēptikos*, *sēptos*, putrefying, from *sēpō*, to putrefy, and *haima*, blood), blood-poisoning by absorption into the circulation of poisonous or putrid matter through any surface. Pyæmia is a sub-variety.

Septuagesima Sunday, the third Sunday before Lent, so called from its being about seventy days before Easter (L. *septuagesimus*, seventieth).

Sep'tuagint, or the LXX., the Version of the Seventy, the Alexandrine Version, &c., is the oldest Greek version of the Old Testament. It is so called either because it was approved and sanctioned by the sanhedrim, or supreme council of the Jewish nation, which consisted of about seventy members, or because, according to tradition, about seventy men were employed on the translation. The language is the Hellenistic Greek of Alexandria, based upon the Attic dialect. The translation is reported by Josephus to have been made in the reign and by the order of Ptolemy Philadelphus, king of Egypt, about 270 or 280 years before the birth of Christ. It is believed, however, by modern critics that the Septuagint version of the several books is the work, not only of different hands, but of separate times. It is probable that at first only the Pentateuch was translated, and the remaining books gradually. The Septuagint was in use up to the time of our Saviour, and is that out of which most of the citations in the New Testament from the Old are taken. It is an invaluable help to the right understanding of the Hebrew Scriptures. The principal extant MSS. known are the Codex Alexandrinus in the British Museum, the Codex Vaticanus in Rome, and the Codex Sinaïticus (imperfect) in St. Petersburg. The principal printed editions are the Complutensian (1514–17), the Aldine (Venice, 1518), the Roman or Sixtine (1587), and the new Cambridge (1887–95).

Sepulchral Mound. See *Tumuli, Barrow.*

Sepul'veda, JUAN GINES DE, a Spanish theologian and historian, born about 1490 at Pozo Blanco, near Cordova. He assisted Cardinal Cajetan at Naples in revising the Greek text of the New Testament, and in 1536 Charles V. appointed him his historiographer, and tutor to his son Philip. In 1557 he quitted the Spanish court, and retired to Mariano, where he died in 1573. Among his writings are a History of Charles V., History of Philip II., History of the Conquest of Mexico, &c.

Sequence, in music the recurrence of a harmonic progression or melodic figure at a different pitch or in a different key to that in which it was first given. In the Roman Catholic Church the term sequence is applied to a hymn introduced into the mass on certain festival days.

Sequestration, in law, the act of separating a thing in controversy from the possession of both parties, till the right is determined by course of law. It is either voluntary or necessary: voluntary when it is done by consent of the parties, and necessary when it takes place by order of the official authority. See *Bankruptcy.*

Se'quin, a Venetian gold coin first struck about the end of the 13th century, and equivalent in value to about 9*s.* 4*d.* sterling. Coins of the same name, but differing in value, were issued by other states.

Sequo'ia (from the American Indian *Sequoyah*, who invented the Cherokee alphabet), a genus of conifers, otherwise called *Wellingtonia* or *Washingtonia*, consisting of two species only—*S. sempervirens*, the redwood of the timber trade, and *S. gigantea*, the Wellingtonia of British gardens and shrubberies, the big or mammoth tree of the Americans. They are both natives of Western America, the latter having been discovered in the Sierra Nevada in 1852. One specimen in Calaveras co., Cal. has a height of 325 feet, and a girth 6 feet from the ground of 45 feet. The Mariposa Grove, 16 miles south of the Yosemite Valley, contains upwards of 100 trees over 40 feet in circumference, and one over 93 feet at the ground, and 64 feet at 11 feet higher. This grove is government property. This tree has been successfully introduced into England, where some of them have already attained a good height. Some of these trees indicate an age of over 2000 years.

Seraglio (se-ral'yō), properly SERAI, the palace of the Turkish sultan at Constantinople. It stands in a beautiful situation, on a point of land projecting into the sea. (See *Constantinople.*) Its walls embrace a circuit of about 9 miles, including several mosques, spacious gardens, the harem, and buildings capable of accommodating 20,000 men, though the number of the sultan's household does not amount to above 10,000. The principal gate of the seraglio is called *Babi Humayum* (Sublime Porte).

Seraing (sé-raŋ), a town of Belgium, in the province of Liége, 3 miles south-west of Liége, on the Meuse. Cockerill's extensive iron, steel, and machine works (including also coal-pits), employing 12,000 hands, are established here, and other industries are carried on. Pop. 36,445.

Serajevo. See *Bosna-Serai.*

Serampore', or SERAMPUR', a town of Hindustan, in the province of Bengal, on the right bank of the Hugli, 12 miles above Calcutta. It is built in the European style, and formerly belonged to the Danes, who sold it to the British government in 1845. Serampore was the head-quarters of the celebrated Baptist missionaries Carey, Marshman, and Ward; and there are a church, school, college, and library connected with the mission. Pop. 35,952.

Serapeum (se-rā-pē'um), the name given to temples dedicated to the god Serapis, the two most celebrated of which are those of Alexandria and Memphis. See *Serapis.*

Ser'aph, plural SERAPHIM, a name applied by the prophet Isaiah to certain attendants of Jehovah in a divine vision presented to him in the temple (Isa. vi. 2). Very commonly by these seraphim have been understood to be angels of the highest order—*angels of fire.* The term seraphim is only used elsewhere of the serpents of the wilderness (Num. xxi. 6, 8 and Deut. viii. 15). See *Cherub.*

Sera'pis, or SARA'PIS, an Egyptian deity whose worship was introduced into Egypt in the reign of Ptolemy I. Plutarch and Tacitus relate that Ptolemy having seen in a dream the image of a god, which he was ordered to remove from the place in which it stood, sent to Sinope, and brought thence a colossal statue, which he set up in Alexandria. It was declared to represent the god Serapis, and appears to have been originally a statue of Pluto or Jupiter. The name Serapis is composed of the names Osiris and Apis. A magnificent temple was built at Alexandria for the reception of the statue of Serapis, and this temple — the Serapeum—was the last hold of the pagans in that city after the introduction of Christianity. The ruins of another temple to Serapis at Memphis were discovered in recent times. The Egyptians themselves never acknowledged him in their pantheon, but he was the principal deity in the Greek and Roman towns of Egypt. Forty-two temples are said to have been erected to him in Egypt under the Ptolemies and Romans; his worship extended also to Asia Minor, and in 146 A.D. it was introduced to Rome by Antoninus Pius. The image of Serapis perished with his temple at Alexandria, which was destroyed in 389 by the order of Theodosius.

Seras'kier, a name given to the commanders-in-chief of Turkish armies, and to the generalissimo or minister of war.

Serbs, the Servians. See *Servia.*

Serenade, music performed in the open air at night; often, an entertainment of music given in the night by a lover to his mistress under her window; or music performed as a mark of esteem and good-will towards distinguished persons. The name is also given to a piece of music characterized by the soft repose which is supposed to be in harmony with the stillness of night. The Italian name *Serenata* is now applied to a cantata having a pastoral subject, and to a work of large proportions, in the form to some extent of a symphony.

Seres, a walled town in Turkey, 35 miles N.E. of Salonica. It is well built, and has various mosques and Greek churches, spacious bazaars, manufactures of linen and cotton goods, and a considerable trade in cotton, tobacco, corn, and fruit. Pop. about 30,000.

Sereth (se-ret'), an important affluent of the Danube. It rises in the Carpathians in Bukowina, flows through Roumania, and joins the Danube 5 miles above Galatz after a course of 300 miles.

Sereth, a town of Austria, in Bukowina, on the river of same name. Pop. 7240.

Serfs, a term applied to a class of labourers existing under the feudal system, and whose condition, though not exactly that of slaves, was little removed from it. Under this system, from the vassals of the king downwards, the whole community was subject to certain degrees of servitude, and it was only on condition of specific services to be rendered to his superior that any individual held his fief. In the case of the lower classes this servitude amounted to an almost complete surrender of their personal liberty. There were two classes of labourers, the villeins and the serfs proper. The former occupied a middle position between the serfs and the freemen. Hallam remarks, in reference to these two classes, that in England, at least from the reign of Henry II., one only, and that the inferior, existed; incapable of property and destitute of redress except against the most outrageous injuries. A serf could not be sold, but could be transferred along with the property to which he was attached. The revival of the custom of manumission counteracted the rapid increase of serfs. A serf could also obtain his freedom by purchase, or by residing for a year and a day in a borough, or by military service. By these various means the serf population gradually decreased. In most parts of the Continent they had disappeared by the 15th century. The extinction of serfdom in England and Scotland was very gradual. As late as 1574 Elizabeth issued a commission of inquiry into the lands and goods of her bondsmen and bondswomen in specified counties in order to compound for their manumission; and even in the 18th century a species of serfdom existed among Scottish miners. Serfdom in Russia was abolished by a manifesto of Alexander II. on March 17, 1861.

Serge, a kind of twilled worsted cloth used for ladies' dresses, gentlemen's summer suits, &c. Navy serge is a thick durable make of this stuff, used chiefly by seafaring folk.

Sergeant, a non-commissioned officer in the army, ranking next above the corporal. He is appointed to see discipline observed, to teach the soldiers their drill, and also to command small bodies of men, as escorts and the like. A company has four sergeants, of whom the senior is called colour-sergeant. Staff-sergeants are higher than these, and above all is the sergeant-major, who acts as assistant to the adjutant.

Sergeant-at-arms. See *Serjeant-at-arms.*

Sergeanty, GRAND, a tenure in feudal times whereby the tenant held land of the crown by performing some service to the sovereign in his own person. Petty-sergeanty was a tenure of land from the king by the service of rendering to him annually some small article, as a bow, sword, spurs, or the like.

Sergipe (ser-zhē'pe), or SERGIPE-DEL-REY, a maritime state of Brazil, N. of Bahia; area, 12,034 square miles. The coast is low and sandy, but the interior is mountainous. The chief river is the São-Francisco on the north. Cotton, sugar-cane, rice, tobacco, &c., are grown, and the woods furnish good timber, dyewoods, and quinine. Pop. 311,170. The chief town is Aracajú; pop. 5000.

Serie'ma (*Dicholŏphus cristātus*), a gralatorial bird of the size of a heron inhabiting the open grassy plains of Brazil and other parts of South America. Its feathers are of a gray colour, and a kind of crest rises from the root of the beak, consisting of two rows of fine feathers curving backwards. The eye is sulphur-yellow, the beak and feet red. It is of retired habits, and utters a loud screeching cry, which somewhat resembles that of a bird of prey or the yelping of a young dog. The seriema is protected in Brazil on account of its serpent-killing habits and is often domesticated.

Series, in mathematics, a set of terms or magnitudes connected by the signs + and −, and differing from one another according to a certain law. $1 + 2 + 3 + 4 + \ldots + n$ is a series whose sum is $\frac{n}{2}(n+1)$. This series is a simple form of *arithmetical progression;* the most general form is $a + (a+b) + (a+2b) + \ldots + (a+(n-1)b)$, and the sum is $\frac{n}{2}(2a + (n-1)b)$, where n

is the number of terms, and b is called the common difference. A *geometrical series* or *progression* is of the form $a + ar + ar^2 + \ldots + ar^{n-1}$, and the sum of such a series is $\frac{a(r^n - 1)}{r - 1}$.

Serinagur. See *Srinagar.*

Seringapatam (properly, *Sri-ranga-patanam*, 'city of Vishnu'), a celebrated town and fortress in the province of Mysore, Madras Presidency, India. It is situated on an island formed by two branches of the Kaveri, 245 miles s.w. of Madras, and is generally ill-built, with narrow, dirty streets. It was once the capital of Mysore. The palace, formerly extensive, is now in ruins. Other notable public buildings are the great mosque, and the pagoda of Sri Ranga, the arsenal, and the cannon foundry. The massive fortifications were the work of Tippoo, the son of Hyder Ali, assisted by French engineers, and the fortress was three times besieged by the British, first in 1791, and afterwards in 1792 and 1799. On the last occasion it was carried by assault, Tippoo himself being slain while fighting desperately, together with 8000 men. Pop. 10,594, once 140,000.

Seri'phos, or SERPHO, a small rocky island belonging to the Greek Cyclades, yielding some corn and wine, while iron ore is mined. It furnished several vessels to the Athenian fleet in the battle of Salamis, and was used as a place of exile by the Romans. Pop. 2943.

Serjeant-at-arms, in England, one of the officers who attend the person of the sovereign to arrest offenders of distinction, &c. Two of them attend on the two houses of parliament, and each has a deputy, their duties being to apprehend any offender at the injunction of the house. On certain occasions the Lord-mayor of London is allowed the attendance of a serjeant-at-arms.

Serjeant-at-law, in England, formerly a barrister of the highest rank. The serjeants-at-law formed a special order or brotherhood, and took precedence over all the other barristers. They were appointed by the crown, and were selected from barristers of not less than sixteen years' standing. In court they were distinguished by a special dress. The judges in common law formerly were always selected from the serjeants.

Serous Fluids, a name given to the lymph-like pellucid fluids secreted by certain membranes and contained in certain cavities of the body. An excess of this secretion constitutes a diseased and often a dropsical condition. See next article.

Serous Membranes are certain double membranes in the human body, as the pleura, pericardium, peritoneum, &c., which form a sort of closed sac surrounding certain organs, the interior surfaces of the sac secreting a small quantity of serous fluid. Their chief function is to allow free action to the organs, and they are also intimately connected with the absorbent system, the vessels of which freely open on their surfaces. These membranes are liable to various diseases, as inflammation (pleurisy, pericarditis, &c.), morbid growths, dropsical effusions, hæmorrhage, &c.

Serpent, a bass musical wind-instrument, of a serpentine form, made of wood covered with leather, having a mouthpiece and several keys; now almost superseded by the ophicleide.

Serpent-charming, an art of great antiquity, confined in practice exclusively to eastern countries. Several allusions are made to it in the Bible, as Ps. lviii. 5; Eccl. x. 11; Jer. viii. 17, and also in classical writers. The power exercised by the charmers over poisonous serpents is unquestionably remarkable, and though there is little doubt that the common practice of the charmers is to extract the fangs before exhibiting their feats, yet we have good authority for believing that it is not unusual to dispense with this. The instrument usually employed in serpent-charming is a kind of pipe, which is varied by whistling and the use of the voice. The effect of this medley of sounds is to entice the serpents from their holes, and this done the serpent-charmer pins them to the ground with a forked stick. In India and other places the art of serpent-charming is an hereditary profession, and is practised for the purpose of gaining a livelihood by administering to the amusement of the public. Besides the evident power music has upon the serpents, they appear to be influenced in a marked degree by the eye of the charmer, who controls them by merely fixing his gaze upon them.

Serpent-eater. See *Secretary-bird.*

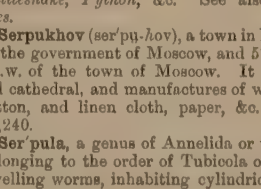
Serpentine, an abundant mineral, usually having a granular or impalpable composition, and presenting red, brown, black, yellow, and gray colours, in veined, spotted, and other figures or combinations; surface almost dull; lustre resinous; streak white, acquires some lustre; hardness 3; specific

gravity 2·5. Serpentine is divided into the *common* and *precious* serpentine, the former of which consists of those varieties which are destitute of handsome colours, while the latter includes all such as are suited to purposes of ornament. Chemically it is a hydrous silicate of magnesia. Serpentine forms mountain masses, and beds in primitive rocks. Ornamental varieties of it are turned on the lathe into vases, and also worked into different ornaments.

Serpents, or SNAKES (*Ophidia*), an order of reptiles, characterized by an elongated and cylindrical body covered with horny scales, but never with bony plates. There is never any breast-bone nor pectoral arch, nor fore-limbs, nor as a rule any traces of hind-limbs. In a few cases, however (as in the python), rudimentary hind-limbs may be detected. The ribs are always numerous, some serpents having more than 300 pairs. These not only serve to give form to the body and aid in respiration, but are also organs of locomotion, the animal moving by means of them and of its scales, which take hold on the surface over which it passes. The vertebræ are formed so as to give great pliancy, most if not all serpents being able to elevate a large portion of their body from the ground. They have hooked, conical teeth, not lodged in distinct sockets, useless for mastication, but serving to hold their prey. In the typical non-poisonous or innocuous serpents, both jaws and the palate bear continuous rows of solid conical teeth. In the venomous serpents, as vipers, rattlesnakes, &c., there are no teeth in the upper jaw excepting the two poison fangs. These are long, firmly fixed in a movable bone, above which there is a gland for the elaboration of poison. Each tooth is perforated by a tube through which the poison is forced. The tongue, which is forked, and can be protruded and retracted at pleasure, is probably rather an organ of touch than of taste. The eye is unprotected by eyelids, but it is completely covered and protected by an anterior layer of transparent skin attached above and below to a ridge of scales which surrounds the eye. No external ear exists. The nostrils are situated on the snout. The heart has three chambers, two auricles and a ventricle. The digestive system comprises large salivary glands, a distensible gullet, stomach, and intestine, which terminates in a cloaca with a transverse external opening. A urinary bladder is absent. The lungs and other paired or symmetrical organs of the body generally exhibit an abortive or rudimentary condition of one of these structures. As regards reproduction they are either oviparous or ovoviviparous, the eggs being either hatched externally or within the animal's body. Many serpents, especially the larger species, as the boas, subsist on prey thicker than themselves, which they crush by constriction, and which they are able to swallow from the throat and body being capable of great dilatation. The order is generally divided into two sub-orders, *Viperina* and *Colubrina*, the former having only two poison fangs in the upper jaw, the latter having solid teeth, besides grooved fangs. The different kinds or species of snakes will be found described in articles under their respective headings, such as *Rattlesnake*, *Python*, &c. See also *Reptiles*.

Serpukhov (ser'pu-*ĥov*), a town in Russia, in the government of Moscow, and 57 miles S.S.W. of the town of Moscow. It has an old cathedral, and manufactures of woollen, cotton, and linen cloth, paper, &c. Pop. 22,240.

Ser'pula, a genus of Annelida or worms, belonging to the order of Tubicola or tube-dwelling worms, inhabiting cylindrical and



Serpula, detached and in tube.

tortuous calcareous tubes attached to rocks, shells, &c., in the sea. The worm fixes itself within its tube by means of the bristles attached to its body-segment. Its head segments are provided with plume-like gills or branchiæ. No eyes exist in this creature, although it is extremely sensitive to the action of light.

Serra da Estrella, a lofty range of granite mountains near the middle of Portugal, highest summit 6460 feet. The range contains some remarkable lakes, part of which are tepid.

Serra'nus, a genus of fishes of the perch family, some of them found on the British coasts.

Serto'rius, QUINTUS, a Roman general, born about 120 B.C. After serving with reputation under Marius against the Teutones in Spain he was made questor in Cisalpine Gaul in 91 B.C. In the quarrel between Sulla and Marius he sided with the latter. When Sulla returned from the Mithridatic war (83 B.C.) Sertorius was proscribed and fled to Spain. There he attempted to organize a force capable of resisting the army sent by Sulla to conquer Spain, but finding his means unequal to the contest he crossed over to Africa. He now assisted the Mauritanians fighting against their king. Having gained several victories and liberated the Mauritanians, the Lusitanians requested him to return to Spain and take command of their troops against the Romans. Opposed to much superior forces he displayed the talents of a skilful general, and successfully resisted the Roman leaders Metellus and Pompey. He was treacherously assassinated at a feast by his friend Perperna B.C. 72. Sertorius has been made the subject of a tragedy by Corneille.

Sertula'ria, the scientific name of a genus of Hydrozoa or zoophytes to which, from their resemblance to miniature trees, the familiar name of 'sea-firs' is given.

Serum, the thin transparent part of the blood. The serum of the blood, which separates from the crassamentum during the coagulation of that liquid, has a pale straw-colour or greenish-yellow colour, is transparent when carefully collected, has a slightly saline taste, and is somewhat unctuous to the touch. It usually constitutes about three-fourths of the blood, the pressed coagulum forming about one-fourth. The term is also applied to the thin part of milk separated from the curd and oil. See *Blood*.

Serval, or BUSH-CAT (*Leopardus Serval*), a carnivorous animal nearly related to the leopard and its allies, a native of Africa. Its general body-colour is a bright yellow or golden lustre, with a grayish tint, and marked with black spots. The average length is about 2 feet 10 inches including the thick bushy tail, which is from 10 to 12 inches long. This animal is readily domesticated. Its fur is in great request, and obtains high prices. The name of *Tiger-cat* is frequently applied to the serval.

Servan, ST. See *Saint-Servan*.

Servant. See *Master and Servant*.

Serve'tus, MICHAEL (properly MIGUEL SERVEDE), a learned Spaniard, memorable as a victim of religious intolerance, was born in 1509 at Villa Nueva, in Arragon. He was the son of a notary, who sent him to Toulouse for the study of the civil law. Here he began to give his attention to theology, and having formed views of the trinity antagonistic to the orthodox doctrine he removed to Germany, where he printed a tract entitled De Trinitatis Erroribus (1531), followed a year later by his Dialogorum de Trinitate Libri duo. Finding that his opinions were obnoxious in Germany, he escaped to France under the name of Michael of Villa Nueva. After fulfilling an engagement with the Frellons, booksellers of Lyons, he went to Paris, where he graduated as doctor of medicine. At Paris Servetus met Calvin for the first time, and an arrangement was made for a theological discussion between them; but Servetus failed to appear. In 1538 he quarrelled with the medical faculty at Paris, and proceeded to Charlieu, near Lyons, where he practised three years, subsequently moving to Vienne. Here, in 1553, he published his matured theological system under the title of Christianismi Restitutio (Restoration of Christianity). He was arrested for heresy and imprisoned, but contrived to escape, and purposed to proceed to Naples. He was, however, apprehended at Geneva on a charge of blasphemy and heresy, and his various writings were sifted in order to ensure his condemnation. The divines of all the Protestant Swiss cantons unanimously declared for his punishment, and Calvin was especially urgent and emphatic as to the necessity of putting him to death. As he refused to retract his opinions he was burnt at the stake on the 27th October, 1553. Servetus is numbered among the anatomists who made the nearest approach to the doctrine of the circulation of the blood.

Servia (Slavonic, *Serbia;* Turkish, *Syrp*), an independent kingdom of Eastern Europe, bounded N. by Austria-Hungary, from which it is separated by the Save and the Danube; E. by Roumania and Bulgaria; S. by Turkey; and W. by Bosnia; area, 18,855 square miles; pop. (1895), 2,314,153. The surface is elevated and is traversed by ramifications of the Carpathians in the north-east, of the Balkans in the south-east, and of the Dinaric Alps in the west. The summits seldom exceed 3000 feet, though the highest reaches 6325. The whole surface belongs to the basin of the Danube, which receives

the drainage partly directly, and partly by the frontier rivers Save, augmented by the Drin and the Timok, but chiefly by the Morava, which flows through the centre of the kingdom. The climate is somewhat rigorous in the elevated districts, but mild in the valleys and plains. There are extensive forests and uncultivated wastes, the forest area being forty-two per cent of the total area. The chief agricultural products are maize, wheat, flax, hemp, and tobacco. Wine is grown in the districts adjoining Hungary, and the cultivation of prunes is extensive. Lead, zinc, quicksilver, copper, iron, and coal are found. Manufactures include carpet-weaving, embroidery, jewelry, and filigree work. The principal exports are dried prunes, pigs, wool, wheat, wine, hides, cattle, and horses; imports, cotton, sugar, colonial goods, hardware, &c. The bulk of the trade is with Austria. The total exports in 1895 amounted to £1,750,000; imports to £1,200,000. There are 340 miles of railway and 1800 miles of telegraph. The great majority of the inhabitants are Slavonians, and adhere to the Greek Church. The Servian language, formerly often called the *Illyrian*, is a melodious Slavonic dialect closely allied to the Bulgarian and Slovenian, and forms with them the southern Slavonic group. Several collections of patriotic Servian songs have been published, and both Goethe and Grimm have acknowledged the excellence of Servian poetry. In prose literature, however, little has been produced besides theological and religious works. The present constitution of Servia dates from 1889. The government is an hereditary monarchy, and the people are represented by an elected legislative assembly called the *skupstchina*. The principal source of revenue is a capitation tax. The estimated revenue in 1896 was £2,520,000, the expenditure rather less; state debt £16,000,000. The standing army numbers about 18,000 men, with a reserve of 155,000 men. Servia is divided into fifteen (formerly twenty-two) administrative districts, of which Belgrade (the capital) forms one by itself. Other principal towns are Nisch, Leskovatz, and Pozarevatz.

History.—Servia was anciently inhabited by Thracian tribes; subsequently it formed part of the Roman province of Mœsia. It was afterwards occupied in succession by Huns, Ostrogoths, Lombards, Avares, and other tribes. The Servians entered it in the 7th century, and were converted to Christianity in the next century. They acknowledged the supremacy of the Byzantine emperors, but latterly made themselves independent, and under Stephen Dushan (1336–56) the Kingdom of Servia included all Macedonia, Albania, Thessaly, Northern Greece, and Bulgaria. About 1374 a new dynasty ascended the throne in the person of Lazar I., who was captured by the Turks at the battle of Kossova (in Albania) in 1389, and put to death. Servia now became tributary to Turkey. About the middle of the 15th century it became a Turkish province, and so remained for nearly 200 years. By the Peace of Passarowitz in 1718 Austria received the greater part of Servia, with the capital, Belgrade. But by the Peace of Belgrade in 1739 this territory was transferred to Turkey. The barbarity of the Turks led to several insurrections. Early in the present century Czerny George placed himself at the head of the malcontents, and, aided by Russia, succeeded after eight years of fighting in securing the independence of his country by the Peace of Bucharest, May 28, 1812. The war was renewed in 1813, and the Turks prevailed. In 1815 all Servia rose in arms under Milosh, and after a successful war obtained complete self-government, Milosh being elected hereditary prince of the land. Milosh was compelled to abdicate in 1839, and was nominally succeeded by his son Milan, who died immediately, leaving the throne vacant to his brother Michael. In 1842 this prince was compelled to follow the example of his father and quit the country, Alexander Kara-Georgevitch, son of Czerny George, was elected in his room; but in December 1858 he also was forced to abdicate. Milosh was then recalled, but survived his restoration little more than a year. His son Michael succeeded him (1860), but was assassinated by the partisans of Prince Alexander on July 10th, 1868. The princely dignity was then conferred on Milan (Obrenovitch), grand-nephew of Milosh. After the fall of Plevna in the Russo-Turkish war of 1877–78 Servia took up arms against Turkey, and by the Treaty of Berlin (13th July, 1878) it obtained an accession of territory and the full recognition of its independence. It was erected into a kingdom in 1882. In 1885 a short war took place between Servia and Bulgaria, resulting in favour of the latter. In 1889 Milan abdicated in favour of his son Prince Alexander, born 14th August, 1876, who has since been the ruler of the country as Alexander I.

Service-berry. See *June-berry* and *Service-tree.*

Service-books. See *Liturgy.*

Service-tree (*Pyrus domestica*, or *Pyrus Sorbus;* natural order Rosaceæ, sub-order Pomeæ), a European tree from 50 to 60 feet high, of the same genus as the apple and pear. It has imparipinnate leaves, whitish beneath; flowers in clusters, cream-coloured, and resembling those of the hawthorn; fruit a reddish-coloured berry (about the size of a small gooseberry), which, like the medlar, is only pleasant in an over-ripe condition. The wood is very hard, compact, solid, fine-grained, and susceptible of a brilliant polish. The tree grows in most parts of Europe, and is occasionally cultivated. What is called the wild service or *sorb* (*Pyrus torminalis*) is somewhat similar to this.

Servites, or SERVANTS OF THE HOLY VIRGIN, a religious order founded at Florence about 1233. It first obtained recognition and sanction from Pope Alexander IV. (1254–61), and from Martin V. (1417–31) it received the privileges of the mendicant orders, but never had much influence in the church. The monks follow the rule of St. Augustine. The order now numbers few members. An order of Servite nuns was founded about the close of the 13th century, but the order now possesses only a few convents.

Servitude, in civil and Scots law, a right whereby a thing is subject to a person for certain uses or conveniences, much the same as an easement in English or American law. Among servitudes are the right which a person has to walk or drive to his house over another's land; the right to have a stream of water conveyed through another's land; the right to prevent another from building so as to obstruct the windows of one's house; &c.

Servius Tullius, the sixth king of Rome. According to the tradition he was the son of a slave, given by the elder Tarquin to Tanaquil, his wife. He married Tarquin's daughter, and on the death of his father-in-law (578 B.C. according to the usual chronology) he was raised to the throne. He defeated the Veientines and the Etruscans, and divided the population of Rome into tribes, instituting at the same time the *comitia centuriata* and *tributa;* he also beautified the city, and built several temples. According to the common story Servius married his two daughters to the grandsons of his father-in-law; the elder to Tarquin, and the younger to Aruns. The wife of Aruns murdered her own husband to unite herself to Tarquin, who had assassinated his wife. Servius was murdered by Tarquin, and his own daughter Tullia ordered her chariot to be driven over the mangled body of her father (534 B.C.).

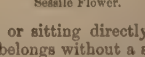
Ses'amum, or SES'AME (*Sesamum*), a genus of annual herbaceous plants, natural order Pedaliaceæ. The species, though now cultivated in many countries, are natives of India. They have alternate leaves and axillary yellow or pinkish solitary flowers. *Sesamum orientāle* and *S. indicum* are cultivated, especially in India, Egypt, and Syria; they have also been introduced in America. Sesamum seeds are sometimes added to broths, frequently to cakes by the Jews, and likewise in the East. The oil expressed from them is bland and of a fine quality, and will keep many years without becoming rancid. It is often used as a salad-oil, and is also known as *gingelly-oil* and *benné-oil.* The leaves of the plant are mucilaginous, and are employed for poultices. Of the seeds two varieties are known in commerce, the one white and the other black.

Sesos'tris, a name given by the Greeks to an Egyptian king, who is not mentioned by that name on the monuments, and who is often identified with Ramses II. See *Ramses.*

Sessa, a town in South Italy, province of Terra di Lavoro, 17 miles east of Gaeta. It is a bishop's see, and has a handsome cathedral. It was a flourishing Roman colony under the name of Suessa-Aurunca. Numerous Roman remains (of aqueducts, baths, theatre, &c.) still exist. Pop. 5319.

Ses'sile (Latin *sessilis,* from *sedeo, sessum,* to sit), in zoology and botany, a term applied

Sessile Leaves.



Sessile Flower.

to an organ attached or sitting directly on the body to which it belongs without a support; as, a *sessile leaf,* one issuing directly from the main stem or branch without a petiole or footstalk; a *sessile flower,* one

having no peduncle; a *sessile gland*, one not elevated on a stalk.

Session, Court of, also called the **College of Justice**, the highest civil judicatory in Scotland, established by James V. in 1532. It consists of thirteen judges: the lord-president, the lord justice-clerk, and eleven ordinary lords. The court is divided into an inner and an outer house. In the former sit the lord-president and three ordinary lords forming the first division, and the lord justice-clerk and other three ordinary lords forming the second division. The remaining ordinary lords sit in the outer court and hear cases singly. The judgments of inferior courts, except those of the small debt courts, are mostly subject to the review of the Court of Session. Judgments of the Court of Session may be appealed against to the House of Lords. The judges are appointed by the crown *ad vitam aut culpam*. See *Justiciary Court*.

Session-clerk, in Scotland, one who officially keeps the books and documents of a kirk-session, makes all entries, and manages the proclamations of banns for marriages.

Sessions. See *Quarter Sessions*.

Sester'tius, an ancient Roman silver coin worth 2½ asses. The sestertius was the fourth part of a denarius, and was worth about 2*d*. sterling.

Sestet'to, a musical piece for six independent instruments or voices.

Sestos. See *Abydos*.

Setaria. See *Millet*.

Seth'ites, a Gnostic sect that existed in Egypt in the 2d century and bore some resemblance to that of the Ophites. They worshipped Seth, the son of Adam, as the son of God, but not of the creator of Adam and Eve, and maintained that he had reappeared in the person of Jesus Christ. They pretended to have several books written by him.

Setif', a town in the Algerian province of Constantine, connected by rail with Algiers, Constantine, and Philippeville. Pop. 12,026.

Seton, in surgery, a skein of silk or cotton, or something similar, passed under the true skin and the cellular tissue beneath, in order to maintain an artificial issue, and moved from time to time to keep the wound open, the object sometimes being to produce counter irritation locally, and at others to relieve the system generally. In the former case setons are applied to the neighbourhood of the part affected, while in the latter they are always inserted at the nape of the neck.

Setter, a breed of dogs, so named from their habit of crouching or 'setting' on observing the game which they are trained to hunt. The distinct races are the English, Irish, and Russian setters. The two former have a narrower muzzle than the pointer, with the lower angle more rounded; the eye quick; the ears long, thin, and covered with wavy, silken hair; the tail with a fan-like 'brush' of long hair, and slightly curled at its tip; the hind legs and feet fringed. The Russian setter has thick woolly fur, the muzzle bearded, the soles of the feet hairy, and possesses a very keen scent. Crossed with the English it produces an admirably sharp variety.

Settle, Elkanah, a minor playwright who lives only in the ridicule heaped on him by Dryden and Pope. He was born at Dunstable 1648, educated at Oxford; produced several plays—Cambyses, the Empress of Morocco, &c., and by his conceit provoked the scourge of Dryden. In his latter days he kept a booth at Bartholomew Fair. He died in the charter-house 1723.

Settlement, in law, (1) a deed by which property is settled; specially the general will or disposition by which a person regulates the disposal of his property, usually through the medium of trustees, and for the benefit of a wife, children, or other relatives; or the disposition of property at marriage in favour of a wife. (2) Legal residence or establishment of a person in a particular parish, town, or locality, which entitles him to maintenance if a pauper, and subjects the parish or town to his support. The *primâ facie* settlement of a pauper is the place of his birth, and this remains his settlement until he has acquired another settlement, which may happen in England in any of the following ways:—A legitimate child under parental authority may acquire a new settlement by a change of settlement on the part of his father, or after his father's death on the part of his mother. An illegitimate child, however, follows the settlement of his mother up to sixteen years of age, or until he acquires another for himself. A married woman takes the settlement of her husband, and retains it after his death. A settlement may also be acquired by renting for at least one whole year a tenement of the value of at least £10, and paying the poor-rate, and residing in the parish in which the tenement is situated for at least forty days; or

by being apprenticed and residing during such apprenticeship for at least forty days in any parish. Finally a settlement may be acquired by residence for one year in another parish than that in which one was born. The Scotch law of settlement requires a person to have resided five years in another parish than that in which he was born before he can acquire a settlement in such other parish. See *Poor*.

Settlement, Act of. See *Act of Settlement*.

Setu'bal, or **Setu'val,** or as called by the English **St. Ubes,** a seaport of Portugal, on a bay of the Atlantic, at the mouth of the estuary of the Sado, 20 miles S.E. of Lisbon. It exports lemons, olives, oil, wine, and great quantities of bay-salt. Pop. over 15,000.

Sevastopol. See *Sebastopol*.

Sevenoaks, a town in Kent, 22 miles S.E. of London. It stands on a ridge of hills, on one of which seven large oak trees are said to have grown, is situated in the midst of beautiful scenery, and is a favourite residential locality. There is a grammar-school dating from 1432. Pop. 7514. The town gives name to a parliamentary division of the county.

Seven Sleepers, a famous story of seven Christian youths of Ephesus imprisoned by order of the Emperor Decius in a neighbouring cave in which they had sought refuge, and where they fell asleep for nearly 200 years, awaking in the reign of Theodosius II. to find, of course, a new civilization. They then related their story to the multitude, gave them their benediction, and expired. The church has consecrated the 27th of June to their memory. The Mohammedans have a similar legend. The basis of the Christian story is said to have been the fact that the dead bodies of seven youths so imprisoned were found in a cave, and the habit which Christian writers had of describing death as falling asleep in the Lord doubtless contributed to the miraculous character of the story.

Seven Sorrows of the Virgin, Feast of, a Roman Catholic festival, instituted in 1725 by Pope Benedict XIII., and celebrated on the Friday before Palm Sunday. The seven sorrows commemorated by this feast are (1) the prediction of Simeon (Luke ii. 34, 35); (2) the flight into Egypt; (3) the loss of Jesus in Jerusalem; (4) the sight of Jesus bearing his cross; (5) the sight of Jesus on the cross; (6) the piercing of the side of Jesus; (7) the burial of Jesus.

Seven Stars. See *Pleiades*.

Seventh-day Baptists. See *Baptists* and *Sabbatarians*.

Seventy, The. See *Septuagint*.

Seven Wise Masters, the title of a collection of early oriental tales, the plot of which is the following: a king's son, well educated by seven wise masters, finds by studying the stars that he is in danger of death if he speaks within seven days. The first day his stepmother, whose improper advances he had repulsed, accuses him to her husband of attempted violence, and demands his execution, at the same time telling the king a story to obtain her end. One of the seven wise masters obtains a day's respite for the prince by telling a tale with a moral counteracting that of the stepmother's. Each day she renews her solicitations and stories to the king with the same object, but the effect of her tales is always nullified by another from one of the seven wise masters, until the expiration of the seven days enables the prince to reveal the designs of his stepmother.

Seven Wise Men, or **Seven Sages of Greece.** As generally set down they were Periander of Corinth, Pittacus of Mitylene, Thales of Miletus, Solon of Athens, Bias of Priēnē, Chilo of Sparta, and Cleobūlus of Lindus. Maxims of prudence and elementary morality are regarded as embodying a summary of their wisdom. Among these maxims are, 'Know thyself,' 'Nothing in excess,' 'Consider the end,' &c.

Seven Wonders of the World, an old designation of seven monuments, remarkable for their splendour or magnitude, generally said to have been: the pyramids of Egypt, the walls and hanging gardens of Babylon, the temple of Diana at Ephesus, the statue of the Olympian Jupiter at Athens, the Mausoleum at Halicarnassus, the Colossus of Rhodes, and the Pharos or light-house of Alexandria.

Seven Years' War, a famous European war which lasted from 1756 to 1763. As the result of a war with Prussia (see *Prussia*) Maria Theresa of Austria had to cede Silesia to Frederick the Great. With a view to recover her lost territory she concluded an alliance with Russia, secured the support of Poland and Saxony, and attempted to form a closer union with France. In the meantime war broke out between France and England (1755), and George II., in order to protect his German states, concluded an alliance with Prussia, while France agreed to aid

Austria against Frederick. Being informed of these negotiations Frederick resolved to anticipate his enemies. In August 1756 he invaded Saxony, occupied the chief towns, and compelled the Saxon army to surrender. This step created a stir in the European courts, and in 1757 Austria, Russia, France, Sweden, and the German Empire were in arms against Frederick, while he had no ally but England and a few German States. In 1757 Frederick marched into Bohemia and gained a bloody battle at Prague (May 6th). Soon after, however, the Austrians under Daun defeated Frederick at Kollin (June 18), relieved Prague, and forced the Prussians to retreat to Saxony and Lusatia. The French army, after defeating Frederick's German allies (under the Duke of Cumberland) at Hastenbeck, united with the imperial forces; Frederick met them at Rossbach and routed both armies on Nov. 5th. He then hurried back to Silesia, which was occupied by the Austrians, and vanquished a superior army under Daun at Leuthen (Dec. 5), thus recovering Silesia. While Frederick was thus occupied in the south and west, his general Lehwald had successfully repelled the Swedes and Russians on the north and east. The next campaign was opened in Feb. 1758 by Ferdinand, duke of Brunswick, who, at the head of Frederick's allies, opposed the French in Lower Saxony and Westphalia. He defeated the French at Krefeld in June, and ultimately drove the enemy behind the Rhine. Frederick, driven out of Moravia, defeated the Russians, who had advanced to Zorndorf, in Brandenburg, was defeated in turn by Daun at Hofkirchen, but before the end of the year drove the Austrians from Silesia and Saxony. Louis XV. and his mistress, the Marchioness de Pompadour, were bent on continuing the war, and concluded a new alliance with Austria, Dec. 30, 1758. Frederick, however, had also obtained a new treaty with Britain, which promised him a large yearly subsidy. The new campaign was opened in March 1759, Prince Henry, Frederick's brother, marching into Bohemia, where he dispersed the hostile forces, and captured immense quantities of military stores. The Russians, having defeated the Prussian general Wedel near Zullichau (July 23), advanced to Frankfort-on-the-Oder. Frederick hastened to meet them in person, and had already defeated them at Kunersdorf (Aug. 12) when his victory was snatched from him by the Austrians under Laudon, who inflicted on him a defeat such as he had never sustained before. Frederick's position was now extremely precarious. The Russians were victorious in his hereditary states, Daun was in Lusatia with a large army, and Saxony was overrun by the imperial troops. In the west Frederick's allies had been more successful. On Aug. 1 Ferdinand gained a splendid victory at Minden over the French troops under Contades and Broglio. On the same day his nephew defeated the French at Gohfeld, and they were driven over the Lahn on one side and over the Rhine on the other. The Swedes also, who, after the battle of Kunersdorf invaded Prussian Pomerania, were driven by Manteuffel and Platen under the cannon of Stralsund. The campaign of 1760 seemed at first to forebode ill success to Frederick. While he himself was engaged in Saxony Fouqué suffered a defeat in Silesia, in consequence of which the Austrians occupied the whole country. Frederick thereupon gave up Saxony in order to recover Silesia. On the 15th August he defeated Laudon at Liegnitz, by which he effected his purpose of recovering Silesia. He then returned to Saxony and attacked the imperial forces at Torgau, on the Elbe (Nov. 3), defeated them in a bloody engagement, and went into winter quarters in Saxony. The Russians also were forced to retire to Poland, and Ferdinand defeated the French at Marburg (July 31). In the campaign of 1761 the operations of Ferdinand of Brunswick and the French on the Rhine consisted of alternate advances and retreats, and the Russians and Austrians were so enfeebled that they failed to make any impression on Frederick's remnant of an army. In the campaign of 1762 the French were defeated (June 24) at Wilhelmsthal, and Cassel surrendered to the allies on Nov. 1. Two days after this the preliminaries of peace between Britain and France were signed, and the peace itself was confirmed at Paris, Feb. 10, 1763. After a short negotiation Frederick concluded a peace with Austria and Saxony at Hubertsburg (Feb. 15), by which he retained Silesia. The war in Europe was accompanied by war by sea and land between the French and British abroad, the result of which was to give Britain a decided superiority over France both in America and India. See *Canada, India.*

Severn, the second largest river in England, formed by the union of two small streams which rise in Mount Plinlimmon,

Montgomeryshire. It flows through Montgomeryshire, Shropshire, Worcestershire, and Gloucestershire, passing the towns of Newton, Welshpool, Shrewsbury, Worcester, Tewkesbury, Gloucester, and Bristol, and after a circuitous southerly course of about 210 miles falls into the Bristol Channel. It receives the Tern, Upper Avon, and Lower Avon on the left, and the Teme and Wye on the right. Its basin has an area of 8580 square miles. It is navigable to Welshpool, about 178 miles above its mouth and 225 feet above sea-level. Below Gloucester its navigation is much impeded, but this has been obviated by a canal from this city to a point on the estuary 2 miles from Berkeley, capable of carrying vessels of 350 tons. Below Gloucester the banks become so low that destructive inundations have not unfrequently occurred. These have been partly caused by one of the most remarkable features of the river, its *bore*, or by the height of the tides, which at the mouth of the Avon sometimes exceed 48 feet, and at Chepstow attain even 60 feet. A railway tunnel 4½ miles long has been driven below the river from near Avonmouth, in Gloucestershire, across to Monmouthshire, and a railway bridge 3581 feet long crosses the river at Sharpness higher up.

Severus, ALEXANDER. See *Alexander Severus.*

Seve'rus, LUCIUS SEPTIMIUS, a Roman emperor, born near Leptis, in Africa, of a noble family, in the year 146 A.D. He early showed an ambitious mind and great military ability. Under Commodus he commanded the legions in Pannonia, and on the murder of Pertinax in March 193 was proclaimed emperor by his troops. Severus accordingly marched to Rome to subdue the partisans of Didius Julianus, who had purchased the imperial purple from the prætorians. On his approach Julian was assassinated by his own soldiers. Severus gained many adherents, banished the prætorians, and ridded himself of the rivalry of Albinus, commander of the Roman forces in Britain, by conferring upon him the title of Cæsar. He then marched to the East against Pescennius Niger, who had also been elected emperor by a powerful army. After many obstinate battles Niger was routed on the plains of Issus (A.D. 194). Having sacked Byzantium and conquered several eastern nations, Severus returned to Rome. He attempted to assassinate Albinus by his emissaries, but when this had failed of success he met him in battle on the plains of Gaul, near Lyons (February 197), and was again victorious. The adherents of Albinus were destroyed, and on the return of Severus to Rome the richest of the citizens were sacrificed, and their property was confiscated by the emperor. Severus, with his two sons Caracalla and Geta, now marched to the East to repel an invasion of the Parthians, and subjugated Seleucia, Babylon, and Ctesiphon. Leaving Parthia he visited the tomb of Pompey the Great, and entered Alexandria. After subduing an insurrection in Britain, and building a stone wall from the Tyne to the Solway Firth as a defence against the incursions of the Caledonians, he died at York, A.D. 211.

Severus, WALL OF, the name given to the wall or barrier formed at the boundary of the Roman empire in Britain between the Solway and the Tyne by the Roman emperor Severus about 210 A.D., following the line of a similar structure made in the reign of Hadrian (A.D. 120), and usually called Hadrian's Wall. It was more than 70 miles long; on the north towards Scotland was a great ditch, on the southern edge of this was a stone wall varying from 6 to 9 feet in breadth and about 16 feet high, with towers between 50 and 60 feet square at intervals of about a Roman mile. South of this was an earthen rampart, then a second ditch, backed by two minor earthen ramparts. At larger intervals were the stations or barracks. Remains of it are still to be seen over long ranges of country.

Sévigné (sā-vēn-yā), MARIE DE RABUTIN-CHANTAL, MARQUISEDE, daughter of Bénigne de Rabutin, baron de Chantal, distinguished for her epistolary talents, born at Paris 1626; died at Grignan, department of Drome, 1696. In 1644 she married the Marquis de Sévigné, who was killed in a duel in 1651, leaving her the mother of a son and a daughter. She then devoted herself to the education of her children and to the culture of her own mind. In 1669 her daughter, to whom she was extremely attached, married the Count de Grignan, and shortly afterwards accompanied her husband to Provence. A seven years' separation from her daughter gave rise to the greater part of the Letters which have gained Madame de Sévigné so much reputation. After the year 1687 Madame de Sévigné was rarely severed from her daughter, and in May 1694 went to live with her permanently. The subjects of many of the Letters of Madame de

Sévigné are so entirely domestic as to produce little interest; but others abound with court anecdotes, remarks on men and books, and the topics of the day, which are conveyed with great ease and felicity. They are models of the epistolary style, perfectly natural from their expression, lively sentiment and description, and a playfulness which gives grace and interest to trifles.

Seville.—La Giralda and part of the Cathedral.

Seville (se-vil'), SEVILLA (se-vēl'-yà), a city of Spain, in Andalusia, on the left bank of the Guadalquivir, capital of a province of the same name, 62 miles N.N.E. of Cadiz. It is an archiepiscopal see, and is largely built in the Moorish style, with narrow, ill-paved streets, the old Moorish houses having spacious interior courtyards with a fountain in the middle. The city has a large and handsome Gothic cathedral dating from the 15th century, with its famous Moorish Giralda or tower, part of a mosque which gave place to the present cathedral, and dating from 1196; an alcazar or palace in the Moorish style; an exchange called the Casa Lonja; a bull-ring, a fine stone building holding 12,000 persons; an aqueduct of 410 arches built by the Moors, a university, a picture-gallery rich in examples of Murillo and Zurbaran; the house of Murillo, with collection of pictures; several interesting churches; an enormous hospital in the Grecian style, built in 1546; &c. On the other side of the river is the suburb of Triana, inhabited by gypsies, bull-fighters, &c. The manufactures include silks, cottons, woollens, pottery, machinery, chocolate, leather, and especially tobacco and cigars, there being an immense cigar factory in which some 5000 females are employed. The river is navigable for vessels of considerable size up to the city; a good trade is carried on, large quantities of oranges in particular being exported. Seville is one of the most ancient cities of Spain. Julius Cæsar gave it the title of *Romula*. It was the residence of the Gothic kings before they moved to Toledo in the 6th century. It surrendered to the Moors early in the 8th century, and remained in their possession till 1248, when Ferdinand III., king of Castile, after a year's siege, forced Seville to open its gates to him. At this time it is said to have contained 600,000 inhabitants; and upon the capitulation 300,000 Moors abandoned the city. After the discovery of America it became the centre of the commerce of the New World, and was very flourishing; but the superior advantages of the port of Cadiz induced the government to order the galleons to be stationed at the latter place, after which it began to decline. In 1810 the city surrendered to Soult, who exercised great cruelties and extortion in it. In 1812 the French were forced by the British to evacuate it. In 1843 it was besieged for nine days by Espartero, when it capitulated. Pop. 143,000.—The province has an area of 5300 square miles, and the greater part consists of fertile plains, producing all kinds of cereals, seeds, vegetables, oranges and other fruits; wine, oil, tobacco, &c. Large numbers of horses are reared. The chief river is the Guadalquivir. Minerals include iron, silver, lead, and copper. The chief exports are wheat, barley, oranges, oil, wool, copper, &c. Pop. 507,000.

Sèvre (sāvr), the name of two rivers in N.W. France. The Sèvre Nantaise rises in the department Deux-Sèvres, and flows into

the Loire opposite Nantes after a course of 86 miles. The Sèvre Niortaise rises 31 miles more to the south-east, in the same department, and flows into the Atlantic 10 miles north of La Rochelle after a course of 89 miles. The department of Deux-Sèvres takes its name from these two rivers.

Sèvres, a town in France, department of Seine-et-Oise, near St. Cloud, on the Seine, here crossed by a handsome bridge. It is celebrated for its glass and porcelain manufactories. The porcelain of Sèvres is unrivalled for brilliancy of colour and delicacy of execution. Previous to 1769 the chinaware made here was of soft porcelain alone, and is known as *Old Sevres;* subsequently it is of hard porcelain. The building in which the manufacture is carried on was founded in the middle of the 18th century, and since 1759 has been state property. Pop. 6552.

Sèvres, Deux (*deu*-sāvr; 'two Sèvres'), a department in France, bounded by Maine-et-Loire, Vienne, Charente, Charente-Inférieure, and Vendée; area, 2316 square miles. A branch of the Cevennes traverses the department from south-east to north-west. Cereals, leguminous crops, and hops are grown. The vine, though extensively cultivated, yields only an inferior wine. The forests are chiefly of hard wood. The minerals include iron, millstones, pavement, and limestone in abundance. The principal manufactures are linen and cotton goods, serge, flannel, woollen hosiery, and gloves. The capital is Niort. Pop. 353,766.

Sewage (sū'āj), the matter which passes through the drains, conduits, or sewers, leading away from human habitations singly, or from houses collected into villages, towns, and cities. It is made up of excreted matter, solid and liquid, the water necessary to carry such away, and the waste water of domestic operations, together with the liquid waste products of manufacturing operations, and generally much of the surface drainage water of the area in which the conveying sewers are situated. Until very recent times human excreta was deposited in outhouses or pits, commonly called cesspools. The invention of water-closets necessitated the use of the sewers, and the water-carriage of excreta was until lately regarded as the most satisfactory method of disposing of these matters. It was argued that the oxygen of the air held in solution by the water destroyed the organic matter and rendered it innoxious. But experience has shown that no river in the kingdom can oxidize the excreta of the towns on its banks, and that whenever these are passed into the rivers at some distance from the sea they are apt to become offensive. Sewage, when fresh and freely exposed to the air, is almost inodorous, but once it accumulates putrefaction sets in, it becomes vilely odorous, and pollutes the atmosphere by the production of poisonous gases. To prevent this it has been suggested that all sewers should have a greater fall than at present, and many attempts have been made to prevent the accumulation of gases in sewers by ventilation. Many methods for the ultimate disposal of sewage have been proposed, but these all may be divided into three great classes, viz. *precipitation*, *irrigation*, and *filtration*, since the throwing of sewage into a body of water in order that it may be carried away by currents, diluted and oxygenated, has ceased to hold a place in modern sanitary schemes. The precipitation of sewage, by which the solid matter is separated from the liquid and used as a manure or otherwise, has been the subject of numerous patents, and many chemicals have been employed for that purpose. Lime, lime and phosphate of alumina, and sulphate of iron have all been used with some degree of success. In the A B C process the sewage is first clarified by blood, charcoal, and clay, and afterwards treated with sulphate of alumina, producing a valuable manure. Irrigation—by which the sewage is directly applied to a piece of ground—has been fully tried in several localities, and many people consider it the most successful solution of the problem as to the ultimate disposal of sewage. The ground is carefully prepared, and the sewage allowed to flow over its surface by gravitation, and by this process the productiveness of the soil is enormously increased. But farmers will only use the liquid when their land requires it; consequently where this system is adopted the local authorities have had to add a farm trust to their many other responsibilities, and the system is generally carried out at a heavy annual loss to the public. Filtration—the purification of sewage by causing it to filter through the earth—has been proposed in cases where land is very valuable or difficult to be secured for the disposal of sewage, on the supposition that this system will only require one acre for every 10,000 inhabitants. As the sewage passes down through the earth the air must of necessity follow it, the oxygen of which will re-aerate

the earth and make it again fit for use. But the chief objection to precipitation, irrigation, and filtration is that they can only be applied at the outfall, and therefore have no beneficial influence on the sanitary state of the localities from which the sewers flow. The most successful methods of dealing with the sewage difficulty are based on the principle of keeping all excremental matters out of the sewers and dealing with them so as to prevent decomposition. Moule's earth-closet has been successfully used in detached houses and villages in Great Britain, but the bulk of material renders it difficult to apply the system in towns. Other systems equally successful render the excreta innocuous by mixing them with charcoal, sweepings, refuse, &c., and manufacturing the mass into manure. Sea-weed charcoal has been used instead of earth with satisfactory results. In Hoey's system the soil pipe from the closet flows into a reservoir underground, from which the excreta are removed by pneumatic pressure and manufactured into portable manure. In Leirnur's system, now in operation at Leyden, Amsterdam, and other European towns, the excreta are forced by vacuum power into hermetically closed tanks above the floor of the central station. The matter is then conducted by air-tight pipes to drying retorts and reduced to a state of powder, or is decanted in a fluid form into vessels for immediate transport to the country. With regard to indoor drainage care should be taken to see that each trap connected either with bath, water-closet, sink, or fixed basin is ventilated to the open air, and the pipe from the bath, sink, or fixed basin should never pass into the trap of the water-closet, as the heated water promotes decomposition. The overflow pipe from the cistern should not open into the soil pipe, and the main soil pipe should be of iron, well covered with protecting composition. Cesspools should in all cases be abolished.

Seward (sū'ârd), ANNA, born at Eyam, Derbyshire, 1747; died at Lichfield, where most of her life was spent, 1809. She was intimate with Erasmus Darwin, and gained an unaccountable reputation as a poet. Sir Walter Scott published her Poems and Correspondence in 1810–11.

Seward (sū'ârd), WILLIAM HENRY, an American statesman, born in Florida, Orange county, New York, May 16, 1801; died at Auburn, Cayuga county, in the same state, Oct. 10, 1872. He studied for the bar, and began practising in Auburn in 1823, but gradually drifted into politics, and in 1830 was elected a member of the New York senate. Displaying marked abilities as a politician he was in 1838 and 1840 chosen governor of his native state, and in 1849 was elected to a seat in the United States senate. He was the friend and adviser of President Taylor, and distinguished himself by his firm resistance to the extension of slavery. In 1860 he was a candidate for the presidency, but being defeated in the convention by Abraham Lincoln he exerted himself to secure Lincoln's election. Lincoln afterwards nominated Seward as secretary of state for foreign affairs, in which post he discharged his duties with great ability. He was dangerously wounded in April 1865, when Lincoln was assassinated, but recovered and fulfilled the same office under Lincoln's successor, Andrew Johnson. He resigned his post on the accession of President Grant in 1869. He wrote a Life of John Quincy Adams; his Speeches, Correspondence, &c., appeared in 1869; and an Autobiography, with continuation, in 1877.

Sewell (sū'el), ELIZABETH MISSING, a novelist, born in the Isle of Wight 1815, daughter of a solicitor. She became well known as the authoress of Amy Herbert (1844), Gertrude (1845), Laneton Parsonage (1846), Margaret Perceval (1847), and other novels of the so-called High Church School of Fiction. She has also written educational works, devotional works, &c.—Her brother, DR. WILLIAM SEWELL, scholar and theologian, born 1805, died 1847, was professor of moral philosophy at Oxford (1836–41), and published religious treatises, translations of the classics, &c.

Sewel'lel (*Haplodon rufus*), a small rodent animal of N. America, inhabiting California, Oregon, and Washington Territory. It has characters that unite it both with the beaver and the squirrels or marmots. It lives in colonies in underground burrows, and feeds on vegetable substances. It is about 12 inches long, stoutly built, and has almost no tail.

Sewing-machines. The first attempts to devise machines for replacing hand labour in sewing are as old as the present century. The first machines were contrivances for imitating mechanically the movements of the hand in sewing. In the machines of Thomas Stone and James Henderson (1804) there were two pairs of pincers, one of which seized the needle below and the other above

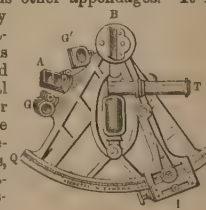
the cloth, and pulled it quite through on either side alternately. In Heilmann's machine, exhibited at Paris in 1834, the needle had the eye in the middle and a point at each end. This machine was intended for embroidery work. Previous to this (in 1830) Thimmonier and Ferrand had contrived a machine producing what is known as the chain-stitch. But the great disadvantage of this stitch is that the whole seam becomes undone if the end of the thread is pulled. In 1854 Singer, an American, devised a machine calculated to remedy this defect of the chain-stitch by means of a mechanism for tying a knot in the seam at every eighth stitch. But long before Singer's invention Elias Howe, a poor American mechanic, had invented the first really satisfactory sewing-machine, for which he obtained a patent in May 1841. Howe's machine used two threads, one of which passed through the eye of the needle, while another was contained in a small shuttle; and it produced a seam in which each stitch was firmly locked, so that it could not come undone by pulling. Many improvements have since been made by other inventors. The principle of the two threads and the lock-stitch has been adhered to in most of the machines that have been invented subsequently to that of Howe, but various details applying that principle have been altered for the better. In the Wheeler-and-Wilson machine the place of the shuttle is supplied by a reel which revolves in a vertical plane within a round piece of mechanism so contrived as to form a loop with the reel-thread, which becomes interlocked with that held by the needle. Of single-thread machines one of the best is that of Willcox and Gibbs, which, while it is easy, quick, and noiseless in working, makes a securer stitch than one-thread machines generally. Sewing-machines have now been adapted to produce almost all kinds of stitching which can be done by the hand. Most sewing-machines are worked by the foot, but many are worked by the hand, and some may be worked by either. Steam and electricity are also sometimes employed as a motive power for sewing-machines. The manufacture of sewing-machines is most extensively carried on in America. In Great Britain also large numbers are now made—chiefly in or near Glasgow.

Sex, the name applied to indicate the particular kind of generative or reproductive element in the constitution of an animal or plant, being that property or character by which an animal is male or female. Sexual distinctions are derived from the presence and development of the characteristic generative organs—*testes* and *ovary*—of the male and female respectively. See *Reproduction*.

Sexagesimals, or SEXAGESIMAL FRACTIONS, fractions whose denominators proceed in the ratio of sixty; as, $\frac{1}{60}$, $\frac{1}{3600}$, $\frac{1}{216000}$. These fractions are called also astronomical fractions, because formerly there were no others used in astronomical calculations. They are still retained in the division of the circle, and of time, where the degree or hour is divided into sixty minutes, the minutes into sixty seconds, and so on.

Sexagesima Sunday, the second Sunday before Lent, the one immediately before Shrove Tuesday, so called because it falls about sixty days before Easter.

Sextant, an improved form of quadrant, capable of measuring angles of 120°. It consists of a frame of metal, ebony, &c., stiffened by cross-braces, and having an arc embracing 60° of a circle. It has two mirrors, one of which is fixed to a movable index, and various other appendages. It is capable of very general application, but it is chiefly employed as a nautical instrument for measuring the altitudes of celestial objects, and their apparent angular distances. The principle of the sextant, and of reflecting instruments in general, depends upon an elementary theorem in optics, viz. if an object be seen by repeated reflection from two mirrors which are perpendicular to the same plane, the angular distance of the object from its image is double the inclination of the mirrors. The annexed figure shows the usual construction of the sextant. QP is the graduated arc, BI the movable index, B mirror fixed to the index, A mirror (half-silvered, half-transparent) fixed to the arm, GG′ coloured glasses, that may be interposed to the sun's rays. To find the angle between two stars hold the instrument so that the one is seen directly through telescope T and the unsilvered portion of the mirror, and move the index arm so that the



Sextant.

image of the other star seen through the telescope by reflection from B and A is nearly coincident with the first, the reading on the arc gives the angle required; half degrees being marked as degrees, because what is measured by the index is the angle between the mirrors, and this is half that between the objects.

Sexton, a corruption of *sacristan*, an under officer of the church, whose business, in ancient times, was to take care of the vessels, vestments, &c., belonging to the church. The greater simplicity of Protestant ceremonies has rendered this duty one of small importance, and in the Church of England the sexton's duties now consist in taking care of the church generally, to which is added the duty of digging and filling up graves in the churchyard. The sexton may be at the same time the parish clerk.

Sextus Empir'icus, a celebrated sceptic, who flourished in the first half of the 3d century A.D. He was probably a Greek by birth, and he is said to have lived at Alexandria and Athens. Scepticism appears in his writings in the most perfect state which it had reached in ancient times, and its object and method are more clearly developed than they had been by his predecessors. (See *Scepticism.*) We have two works by him, written in Greek, one, entitled Outlines of Pyrrhonism, explains the method of Pyrrho; the other, entitled Against the Mathematicians, is an attempt to apply that method to all the prevailing philosophical systems and other branches of knowledge.

Seychelles (sā-shel'), a group of about thirty islands in the Indian Ocean, between lat. 3° 40′ and 5° 35′ S., and lon. 55° 15′ and 56° E. They were first occupied by the French, and were ceded to the British in 1814. The settlers are mostly of French extraction. The largest island is Mahé, the majority of the others being mere rocks. With the exception of two consisting of coral, they are composed of granite piled up in huge masses, and terminating in peaks. Most of them are covered with verdure, and yield good timber. Cotton, coffee, cocoa, spices, tobacco, maize, rice, and tropical fruits are cultivated; and cocoanut-oil, soap, vanilla, and tortoise-shell exported. The exports are of the average annual value of £35,000; the imports about the same sum. Pop. 16,021.

Seymour (sē'mur), a noble English family of Norman origin. Their name is corrupted from St. Maur, which was their seat in Normandy. They acquired lands in Monmouthshire in the 13th century, and early in the 15th century added to these estates others in Somersetshire. The first conspicuous member of this family, Sir John Seymour, was the father of the third wife of Henry VIII. and of Edward Seymour, who, on his sister's marriage in 1536, was raised to the peerage as Viscount Beauchamp, and the following year created Earl of Hertford. During the minority of Edward VI. the Earl of Hertford caused himself to be appointed governor of the king and protector of the kingdom (Jan. 1547). The following month he obtained the post of lord-treasurer, was created Duke of Somerset, and made earl-marshal. The success of his expedition against Scotland (1547) excited the jealousy of the Earl of Warwick and others, who procured his confinement in the Tower in October 1549. He was deprived of his offices and honours and heavily fined. Six months later he obtained a full pardon, was admitted to court, and ostensibly reconciled to Warwick. The latter, however, caused Somerset to be again arrested in October 1551 on a charge of treasonable designs against the lives of some of the privy-councillors. He was tried, and beheaded on Tower Hill in Jan. 1552.—His brother, Thomas, Lord Seymour of Sudeley, was made a peer and lord high-admiral of England by the protector. He married Catherine Parr, widow of Henry VIII., and was continually plotting against his brother. In 1548 he was attainted of treason, and he was executed in 1549.—The eldest son of the protector was created by Elizabeth Earl of Hertford, and the grandson of this Earl of Hertford having distinguished himself in the royalist cause, obtained in his favour the revival of the title of Duke of Somerset in 1660. On the extinction of his line the descendants of the first Duke of Somerset by his first wife claimed the title, which they still hold.—A descendant, Sir Edward Seymour, was made speaker of the House of Commons in 1773, and subsequently became treasurer of the navy. He was an influential but unscrupulous politician.

Seymour, Jane. See *Henry VIII.*

Seyne (sān), La, a seaport town of Southern France, in the department of Var, 3 miles S.W. of Toulon. It has an extensive ship-building yard, and a considerable trade in fish. Pop. 8360.

Sfax, a town on the east coast of Tunis, situated in the midst of fruit gardens. It

is surrounded by walls and bastions, and has a strong citadel. It exports large quantities of fruit, wool, sponges, alfa, &c. Sfax was captured by the French after a two days' bombardment on July 16, 1881. Pop. 30,000.

Sforza, a celebrated Italian house, which played an important part in the 15th and 16th centuries, gave six rulers to Milan, and formed alliances with most of the princely houses of Europe.

Shad, a name of several European fishes, of the family Clupeidæ or herrings, and including two species, the common or allice shad (*Clupea alosa*) and the twaite shad (*C. finta*). The common shad inhabits the sea near the mouths of large rivers, and in the spring ascends them for the purpose of depositing its spawn. The form of the shad is the same as that of the other herrings, but it is of larger size, and in some places receives the name of 'herring king.' Its colour is a dark blue above, with brown and greenish lustres, the under parts being white. The twaite shad is about a half less than the common species, and weighs on an average about 2 lbs. An American species of shad (*C. sapidissima*), varying in weight from 4 to 12 lbs., is highly esteemed for food, and is consumed in great quantities in the fresh state. They are found all along the coast from New England to the Gulf of Mexico, and have been successfully introduced on the Pacific coast.

Shad-bush. See *June-berry.*

Shaddock (*Citrus decumāna*), sometimes called *pompelmoose,* a large species of orange, attaining the diameter of 7 or 8 inches, with a white, thick, spongy, and bitter rind, and a red or white pulp of a sweet taste, mingled with acidity. It is a native of China and Japan, and was brought to the West Indies by a Captain Shaddock, from whom it has derived its name.

Shadoof', SHADUF', a contrivance extensively employed in Egypt for raising water from the Nile for the purpose of irrigation. It consists of a long stout rod suspended on a frame at about one-fifth of its length from the end. The short end is weighted so as to serve as the counterpoise of a lever, and from the long end a bucket of leather or earthenware is suspended by a rope. The worker dips the bucket in the river, and, aided by the counterpoise weight, empties it into a hole dug on the bank, from which a runnel conducts the water to the lands to be irrigated. Sometimes two shadoofs are employed side by side. When the waters of the river are low two or more shadoofs are employed, the one above the other. The lowest lifts the water from the river and

Raising water by Shadoofs.

empties it into a hole on the bank, a second dips into this hole, and empties the water into a hole higher up, and a third dips into the hole just below, and empties the water at the top of the bank, whence it is conveyed by a channel to its destination.

Shadow, the figure of a body projected on the ground, &c., by the interception of light. *Shadow,* in optics, may be defined a portion of space from which light is intercepted by an opaque body. Every opaque object upon which light falls is accompanied with a shadow on the side opposite to the luminous body, and the shadow appears more intense in proportion as the illumination is stronger. An opaque object illuminated by the sun, or any other source of light which is not a single point, must have an infinite number of shadows, though not distinguishable from each other, and hence the shadow of an opaque body received on a plane is always accompanied by a *penumbra,* or partial shadow, the complete shadow being called the *umbra.* See also *Penumbra.*

Shadwell, THOMAS, an English dramatic poet, born at Stanton Hall, Norfolk, in 1640, educated at Cambridge, studied the law for some time at the Middle Temple, and then visited the Continent. On the recommendation of the Earl of Dorset he was created

poet-laureate in the place of Dryden, whose bitter enmity against Shadwell found expression in his severe satire of Mac Flecknoe. He died in 1692, in consequence, it is supposed, of taking too large a dose of opium. Although coarse, his comedies are not destitute of genuine humour.

Shaftesbury, or SHASTON, a municipal borough, England, county of Dorset, 28 miles N.N.E. of Dorchester. It is a purely agricultural town, and was a parliamentary borough till 1885. Pop. 2122.

Shaftesbury, ANTHONY ASHLEY COOPER, FIRST EARL OF, was born at Wimborne St. Giles's, in Dorsetshire, in 1621, and succeeded to a baronetcy on the death of his father in 1631. After leaving Exeter College, Oxford, he studied law at Lincoln's Inn, and was chosen representative for Tewkesbury in 1640. At the commencement of the civil war he supported the royal cause, but advised mutual concession. Finding that in consequence of this opinion he was distrusted by the court he joined the parliament, and received command of its forces in Dorsetshire. When Cromwell turned out the Long Parliament, Sir Anthony was one of the members of the convention which succeeded, nevertheless he signed the protestation charging the protector with arbitrary government, which did not, however, prevent him from becoming one of his privy-council. After the deposition of Richard Cromwell he aided the restoration of Charles II. with all his influence, and in 1661 was created Baron Ashley, and appointed chancellor of the exchequer and a lord of the treasury. Yet he strongly opposed the Corporation Act (1661) and the Act of Uniformity (1662), both measures favoured by the crown. He afterwards became a member of the obnoxious Cabal. In 1672 he was created Earl of Shaftesbury and lord high chancellor. His conduct on the bench was able and impartial, but he was deprived of office, probably through the influence of the Duke of York; and he at once became one of the most powerful leaders of the opposition. For his warmth in asserting that a prorogation of fifteen months amounted to a dissolution of parliament he was confined in the Tower from Feb. 1677 to Feb. 1678. After his liberation he took a prominent part in the attacks on Catholics during the popish plot scare. In 1679 he became president of the council and the same year was instrumental in passing the Habeas Corpus Act. In 1681 he was indicted for high treason but acquitted. He entered into the plots of the Monmouth party and had to fly to Holland, where he died in 1683. He is the Achitophel of Dryden's famous satire.

Shaftesbury, ANTHONY ASHLEY COOPER, THIRD EARL OF, grandson of the preceding, a celebrated philosophical and moral writer, was born at Exeter House, in London, 1671. When only eleven years of age he could read Greek and Latin with ease. In 1693 he became the representative in parliament of Poole, in Dorsetshire, and strongly supported measures favourable to public liberty. In consequence of ill health he resigned his seat in 1698, and visited Holland as a student of physic, where he became acquainted with Bayle, Leclerc, and other literary men. In 1708–9 he published several works of a philosophical character, among others a Letter on Enthusiasm and an Inquiry concerning Virtue or Merit. In 1710 his rapidly declining health led him to fix his residence at Naples, where he died in 1713. His writings were collected and published together under the title of Characteristics of Men, Manners, Opinions, and Times. In 1716 and 1721 collections of his correspondence were published. As a writer he is remarkable for the elegance but also for the excessive artificiality of his style. In all his works Lord Shaftesbury was a firm believer in the fundamental doctrines of natural religion; but, although he professed a respect for Christianity, he was doubtless sceptical in regard to revelation, and sometimes indulged his humour on scriptural points with the greatest indecorum.

Shaftesbury, ANTHONY ASHLEY COOPER, SEVENTH EARL OF, born April 28, 1801, son of the sixth earl, was educated at Oxford, and sat in the House of Commons from 1826 to 1851, when he succeeded to the peerage. He supported the administrations of Liverpool and Canning, and zealously laboured to improve the condition of the labouring classes. He was president of the Bible Society, of the Pastoral Aid Society, of the Protestant Alliance, and of other religious organizations. He died Oct. 1, 1885.

Shag (*Graculus cristatus*), a species of cormorant, also called the crested or green cormorant, from its dark-green plumage. Its average length is about 26 inches, and its nest, composed of roots and stalks of sea-weed lined with grass, is usually found on rocky ledges. The young birds have a brownish tint amid the green plumage, with brown and white under-surfaces.

Shagreen', a species of leather prepared without tanning, from horse, ass, and camel skin, the granular appearance of its surface being given by imbedding in it, whilst soft, the seeds of a species of plant, and afterwards shaving down the surface, and then by soaking causing the portions of the skin which had been indented by the seeds to swell up into relief. It is dyed with the green produced by the action of sal-ammoniac on copper filings. It is also made of the skins of the shark, sea-otter, seal, &c. It was formerly much used for watch, spectacle, and instrument cases.

Shah, in Persian, signifies 'king.' The proper title of the king in Persia is *Shah-in-shah*, King of kings.

Shah Jehan, the fifth Mogul emperor of Delhi, reigned from 1627 to 1658, when he was deposed by his son Aurengzebe. During his reign the Mogul Empire attained a great magnificence; he founded Delhi, where he erected the celebrated peacock throne, valued at £6,500,000; built the Taj Mahal at Agra, a mausoleum to his favourite wife, and several other buildings which have become architecturally famous. He died at Agra in 1666.

Shahjehánpur, a town in India, in the North-west Provinces, 95 miles north-west of Lucknow, in the executive district of the same name. There is a cantonment at the place, an American Methodist mission station with churches and schools; and sugar works in the neighbourhood. Pop. 78,522. —The district forms a portion of the Rohilkhand Division; has an area of 1744 sq. miles, and pop. of 918,851.

Shairp, JOHN, LL.D., born at Houstoun House, Linlithgow, in 1819; died 1885. He was educated at Edinburgh Academy, Glasgow University, and Balliol College, Oxford. After a term as assistant-master at Rugby he was appointed professor of humanity in the united College of St. Salvador and St. Leonards at St. Andrews in 1861, becoming principal in 1868. From 1871 he also held the chair of poetry at Oxford. His works consist of Kilmahoe, a Highland Pastoral, and other Poems (1864); Studies in Poetry and Philosophy (1868); Culture and Religion (1870); Poetic Interpretation of Nature (1877); Burns, in the Men of Letters Series (1879); and Aspects of Poetry (1881).

Shakers, or SHAKING QUAKERS, a sect which arose at Manchester, in England, about 1747, and has since been transferred to America, where it now consists of a number of thriving *families*. The formal designation which they give themselves is the United Society of Believers in Christ's Second Appearing. That of Shakers was given them in ridicule, but is nevertheless passively accepted by them. The founder of the sect as it at present exists was Ann Lee, an expelled Quaker, born in Manchester in 1756. She went to America in 1774 with seven followers and formed the first settlement at Watervliet, near Albany. They agree with the Quakers in their objections to take oaths, their neglect of certain common courtesies of society, their rejection of the sacraments, &c. They believe in the immediate revelations of the Holy Ghost (gifts); maintain that the old law is abolished, the new dispensation begun; that intercourse between heaven and earth is restored; that God is king and governor; that the sin of Adam is atoned, and man made free from all errors except his own; that every human being will be saved; that the earth is heaven, now soiled and stained, but ready to be brightened by love and labour into its primeval state. At first the motions from which they derive their name were of the most violent, wild, and irregular nature—leaping, shouting, clapping their hands, &c.; but at present they move in a regular, uniform dance to the singing of a hymn, and march round the hall of worship, clapping their hands in regular time. The societies are divided into smaller communities called families, each of which has its own male and female head. Celibacy is enjoined upon all, and married persons on entering the community must live together as brother and sister. All property is held in common, and all bind themselves to take part in the family business—the men either as farmers, builders, gardeners, smiths, painters, or as followers of some other handicraft; and the women in some household occupation, or in the work of education. In America there are about twenty communities with between two and three thousand members, chiefly in the New England States. A party of about 100 settled in the New Forest, Hampshire, about 1871, and were evicted for debt in the winter of 1874, when they suffered much from the severe weather. After the death of their leader, Mrs. Girling, the community dispersed.

Shakspere, WILLIAM, English poet and dramatist, was born in 1564, at Stratford-

upon-Avon, a town in Warwickshire. It is known (from the parish register of his birth-place) that he was baptized on the 26th of April, and from this it has been considered probable that he was born on 23d April. His father was John Shakspere, a burgess of Stratford, who combined his business as a butcher, a wool-stapler, and a glover with dealings in timber and corn. His mother was Mary Arden, daughter of Robert Arden of Wilmecote, a prosperous yeoman farmer. They had eight children (four sons and four daughters), of whom William was the third. When the third son was born and for some time afterwards the family were prosperous, for we find that in 1568 John Shakspere was high-bailiff of Stratford. From this fact it may safely be inferred that his son received the best education which the grammar-school of Stratford could give. How long the boy remained at school is not known, but it is assumed that he would be withdrawn about his fourteenth year, owing to the difficulties which in 1578 had overtaken his father's financial affairs. Concerning his occupation after leaving school we are free to choose among the various traditions which report that he was apprenticed to a butcher, that he was for some time a schoolmaster, and that he was a lawyer's clerk. Passing from conjecture, the first absolutely authentic event in Shakspere's life is his marriage with Anne Hathaway, daughter of a yeoman in the hamlet of Shottery, near Stratford. The marriage bond is dated November 28, 1582, at which date Shakspere was in his nineteenth year, while, from the date on her tombstone, it is known that his wife was eight years older. On the 26th May following their first child, named Susanna, was baptized, and in February of 1585 a son and daughter were born, who received the names of Hamnet and Judith.

From this date until we find Shakspere established in London as a player and dramatist there is a gap of seven years, during which we are again left to tradition and conjecture. To account for his leaving Stratford it has been suggested that his marriage with Anne Hathaway had proved unsuitable and unhappy, but there is no positive evidence in support of this belief. Then, again, there is the famous legend of the deer-stealing for which it is said he was prosecuted by Sir Thomas Lucy of Charlecote. In retaliation he wrote, according to Rowe, a satirical ballad which so enraged the baronet that Shakspere thought it prudent to leave Stratford. The more probable reason is, that his increasing domestic responsibilities, together with the acquaintance he presumably had with the players from London who visited Stratford, induced him to push his fortune in the city. What was his occupation at the outset of his London life is also doubtful. Tradition has it that he tended the horses of those who rode to the plays, and with such success that he organized a company of youthful assistants who were known as Shakspere's boys. There is probably little truth in this story. What is certain, however, is the fact that he soon became a well-known player and a dramatist of such distinction as to call forth an envious reference in 1592 from a fellow-dramatist. This is found in a Groatsworth of Wit, written by Robert Greene, and published a few weeks after his death by Chettle. In this piece Greene describes a rival dramatist as 'an upstart crow beautified in our feathers, that, with his *tygre's heart wrapt in a player's hyde*, supposes he is as well able to bombast out a blank verse as the best of you, and being an absolute *Johannes fac totum*, is, in his own conceit, the only Shakscene in a country.' While this may certainly be accepted as having reference to Shakspere, the supposed allusion in Spenser's Tears of the Muses (1590–91) to Shakspere as 'our pleasant Willy' is not easily established.

The first date in Shakspere's life after his arrival in London which is settled by clear evidence is 1593. In that year he published his Venus and Adonis, with a dedication of this, 'the first heir of my invention,' to Henry Wriothesly, earl of Southampton; and in the following year he dedicated to the same patron his other poem of The Rape of Lucrece. As suggesting that this patronage was substantial in its nature, there is a story to the effect that the earl at one time gave Shakspere £1000 to complete some purchase he had on hand. Whatever truth there may be in the story, it is certain that about this time Shakspere began to grow in fortune and in fame. In the accounts of the treasurer of the chamber it is set down that he appeared, along with Burbage and other players, before Queen Elizabeth in the Christmastide of 1594. He must, also, at this period have been producing his earlier plays and thriftily accumulating the wealth which they were likely to bring. In connection with this increase of fortune it *is*

noteworthy that the affairs of his father, John Shakspere, seem also to have improved, for in 1596 he applied at the herald office for a grant of arms, which application was conceded in the following year. In 1596 Shakespeare's only son Hamnet died and was buried at Stratford, where the family continued to reside. The tradition is that Shakspere visited his native town once a year during the time that he lived in London. However this may be, it is clear that his interest in Stratford was not founded entirely in sentiment or family affection, for we find that in 1597 he bought a substantial house called New Place for £60; and in a return of grain and malt he is described as the holder of ten quarters. There is also documentary evidence to prove that he was possessed of property in the parish of St. Helen's, Bishopgate. That he was a man of some public importance in London is also indicated by a letter dated 1598, and still extant, in which Abraham Sturley suggests to Richard Quiney that by the friends of Mr. Shakspere he might be helped to certain favours which they desired conferred on their native town of Stratford; and that the player and dramatist was a man able and likely to be generous with his friends is suggested by an extant letter in which this same Richard Quiney applies to Shakspere for a loan of £30.

While these things indicate the growth of his material prosperity, we have proof that his fame as a lyrical poet and dramatist was also being securely established. For in 1598 there was published the Palladis Tamia, by Francis Meres, in which twelve of his plays are enumerated; and in which mention is made of his 'sugred sonnets among his private friends.' Yet, notwithstanding this literary activity, he was still a player, for when Jonson's comedy of Every Man in his Humour was produced in 1598, Shakspere took part in the performance. In the following year we find that he was a shareholder in the Globe Theatre, and his practical turn is still further evidenced by the fact that he bought (1602) 107 acres of arable land in the parish of Old Stratford for £320, and acquired (1605) for £440 the unexpired term of a lease of the tithes of Stratford, Old Stratford, Bishopton, and Welcombe. Along with these material possessions he received the style and title of William Shakspere, Gentleman, of Stratford-on-Avon; but in London he was still a player in 1603, since we know that when Ben Jonson's play of Sejanus was produced in that year Shakspere occupied a place in the list of actors. At what time he ceased to appear upon the stage is not known; we are even left in doubt when he ceased to live in London and retired to Stratford, though this was probably between the years 1610 and 1612. His father, John Shakspere, had died in 1601; his eldest daughter Susanna had married, in 1607, a practising physician named John Hall; in the same year his brother Edmund, who was also a player, died in London and was buried in Southwark, the author of Hamlet paying twenty shillings for 'a forenoon knell of the great bell;' and in 1608 his mother, Mary Shakspere, followed her husband to the grave. Of his life in Stratford after his return we have no information except doubtful stories and a few scraps of documentary evidence. The latter chiefly prove that he continued to retain a keen interest in the everyday facts of the world. Thus we find him, in 1611, subscribing towards the expenses of a Stratford road-bill in parliament; buying a house in Blackfriars, London, for £140; engaging in a chancery suit with reference to his tithes in Stratford; and opposing the inclosure of some common lands at Welcombe. In February 1616 his younger daughter Judith married Thomas Quiney, a vintner of Stratford; on the 25th of the following month he executed his will; and in another month he was dead. The cause of his death is unknown, but in Stratford there was a tradition 'that Shakspere, Drayton, and Ben Jonson had a merry meeting, and, it seems, drank too hard, for Shakspere died of a fever there contracted.' By his will he left the bulk of his property to Susanna Hall and her husband, his daughter Judith, his sister Joan, and his godson, while a few friends and fellow-players were also remembered. To his wife he bequeathed specifically the 'second-best bed with the furniture;' for otherwise there would probably be ample provision made for her as a widow having right of dower in her husband's freehold property. He was buried in the chancel of Stratford church, on the north wall of which a monument, with bust and epitaph, was soon afterwards set up. The face of this bust, which may have been modelled from a cast taken after his death, was coloured, the eyes being hazel, the beard and hair auburn. This bust, and the portrait engraved by Droeshout, prefixed to the first folio edition of his writ-

ings (1623), are the chief sources of our information regarding the appearance of the poet. There is also a death-mask dated 1616, and what is known as the Chandos portrait, which are interesting but not authoritative. As for his character, as estimated by his contemporaries, it found fit expression in the words of Ben Jonson.

William Shakspere, from monumental bust at Stratford-upon-Avon.

'I loved the man,' he said, 'and do honour his memory on this side idolatry as much as any. He was indeed honest, and of an open and free nature, had an excellent phantasy, brave notions, and gentle expressions.' Seven years afterwards (1623) his wife, Anne Hathaway, died. His daughter Judith, whose three children died in childhood, survived him until 1662, while his elder daughter Susannah died in 1649, leaving one daughter named Elizabeth. This grandchild of the poet's was married first to Mr. Thomas Nash of Stratford, and then to Sir John Barnard, but in 1670 she died childless, and thus the family of Shakspere became extinct.

In classifying the plays of Shakspere by the aid of such chronology as is possible, modern critics have found it instructive to divide his career as a dramatist into four marked successive stages. The *first period* (1588–93) marks the inexperience of the dramatist, and gives evidence of experiment in characterization, looseness in the construction of plot, with a certain symmetrical artificiality in the dialogue. To this stage belong:—Titus Andronicus (1588–90) and part I. Henry VI. (1590–91), both of which, it is thought, Shakspere merely retouched; Love's Labour's Lost (1590); The Comedy of Errors (1591); The Two Gentlemen of Verona (1592–93); A Midsummer Night's Dream (1593–94); parts II. and III. Henry VI. (1591–92), in which it is thought probable that Marlowe had a hand; and King Richard III. (1593). The *second period* (1594 to 1601) is that in which, with increased security in his art, the dramatist sets forth his brilliant pageant of English history, his brightest conception of the comedy of life, and more than proves his capacity for deeper things by one great romantic tragedy. To this stage belong:—King Richard II. (1594); parts I. and II. Henry IV. (1597–98); King Henry V. (1599); King John (1595); Romeo and Juliet (1596–97); The Merchant of Venice (1596); Taming of the Shrew (1597); Merry Wives of Windsor (1598); Much Ado about Nothing (1598); As You Like It (1599); and Twelfth Night (1600–1). The *third period* (1602–8) shows that the dramatist, having mastered all the resources of his art and tasted life to the full, is strangely fascinated by mortal mischance, so that even his comedy becomes bitter, while his tragedy is black with the darkest tempests of passionate human experience. To this stage in his development belong:—All's Well that Ends Well (1601–2); Measure for Measure (1603); Troilus and Cressida (1603); Julius Cæsar (1601); Hamlet (1602); Othello (1604); King Lear (1605); Macbeth (1606); Antony and Cleopatra (1607); Coriolanus (1608); and Timon of Athens (1607–8). The *fourth period* (1609 to 1613) is that in which Shakspere, after having passed through a season which was probably darkened by his own personal experiences, suddenly attained the glad serenity of mind which enabled him to write his last romantic plays. To this period belong:—Pericles (1608), which is only partly from Shakspere's hand; Cymbeline (1609); The Winter's Tale (1610–11); The Tempest (1610); with (the doubtful) Two Noble Kinsmen (1612) and King Henry VIII. (1612–13), which are partly by another writer, supposed to be Fletcher. Of non-dramatic pieces Shakspere was the author of Venus and Adonis (1593), The Rape of Lucrece (1594), the Sonnets and A Lover's Complaint (1609); while it is agreed that only a few of the poems in the collection published under the name of The Passionate Pilgrim (1599) were written by him. The Phœnix

and the Turtle, with Shakspere's name appended, was published as one of the poems in Chester's Love's Martyr, or Rosalin's Complaint (1601). The plays (of which there were eighteen, published singly in quarto form between the years 1597 and 1622) were mostly pirated, but a few were probably printed from the author's manuscripts. The first collected edition (the First Folio) was published in 1623, seven years after Shakspere's death, by John Heminge and Henry Condell, who claim to be the 'friends and fellows' of the author. These editors depreciate the 'maimed and deformed' copies previously published, and declare that they are now offered 'cured and perfect,' while the eighteen plays not previously published are 'absolute in their numbers.' What is known as the Second Folio (1632) is a reprint of the former with conjectural emendations which are often misleading. The Third Folio (1664) contains seven additional plays, and the Fourth Folio (1685) was a reproduction of the third. The more important critical editions of Shakspere's plays and complete works since published are as follows:—Nicholas Rowe, 7 vols. 8vo (1709); Alexander Pope, 7 vols. 4to (1723–25); Louis Theobald, 7 vols. 8vo (1733); Sir T. Hanmer, 6 vols. 4to (1743–44); Bishop Warburton, 8 vols. 8vo (1747); Samuel Johnson, 8 vols. 8vo (1765); E. Capell, 10 vols. 8vo (1767); Johnston and Steevens, 10 vols. 8vo (1773); E. Malone, first 'Variorum Edition,' 10 vols. 8vo (1790); Boswell, 'Variorum Edition,' 21 vols. 8vo (1821); S. W. Singer, 10 vols. 18mo (1826); C. Knight, 8 vols. 8vo (1838–43); J. P. Collier, 8 vols. 8vo (1841–44); J. O. Halliwell, 16 vols. folio (1853–65); N. Delius, 8 vols. 8vo (1854–65); A. Dyce, 6 vols. 8vo (1857); R. G. White (Boston), 12 vols. 8vo (1857–60); Furness, 'Variorum Edition' (Philadelphia), 8 vols. 8vo (1873, and subsequent years; not yet completed); F. A. Marshall, 'Henry Irving Edition,' 8 vols. (1888–90). The chief biographies are:—Shakspere, a Biography, by C. Knight (1843); Outlines of the Life of Shakspere, by J. O. Halliwell-Phillipps, 2 vols. (1886); and F. G. Fleay's Chronicle History of the Life and Work of W. Shakspere, 8vo (1886).

Shale, a term applied in geology to all argillaceous strata which possess to a greater or less degree the quality of splitting into layers parallel to the planes of deposition. It is the solidified mud of ancient waters, and is various in colour and composition, the chief varieties being sandy, calcareous, purely argillaceous, and carbonaceous. Shale is frequently found deposited between seams of coal, and commonly bears fossil impressions. The sub-variety known as bituminous shale burns with flame, and yields an oil, mixed with paraffin, of great commercial importance. Alum is also largely manufactured from the shales of Lancashire, Yorkshire, and Lanarkshire.

Shalloon', a light woollen stuff said to derive its name from *Châlons* in France, where it was originally manufactured.

Shal'lop, the name is usually applied to a large boat with two masts and rigged like a schooner.

Shallot', a plant, the *Allium ascalonicum*, a species of onion, the mildest cultivated. It is sufficiently hardy to endure the severest winters of England. The shallot is used to season soups and made dishes, and makes a good addition in sauces, salads, and pickles.

Sha'manism, a general name applied to the idolatrous religions of a number of barbarous nations in Northern Asia. The Shaman is a wizard priest who performs sacrifices and works magical spells. The worshippers believe in a Supreme Being, but to this they add the belief that the government of the world is in the hands of a number of secondary gods both benevolent and malevolent towards man, and that it is absolutely necessary to avert their malign influence by magic rites and spells.

Shammai (sham'a-ī), a Jewish rabbi of whom little is known, except that he was a contemporary of Hillel and his rival in the Sanhedrim. See *Hillel*.

Shamo, DESERT OF. See *Gobi*.

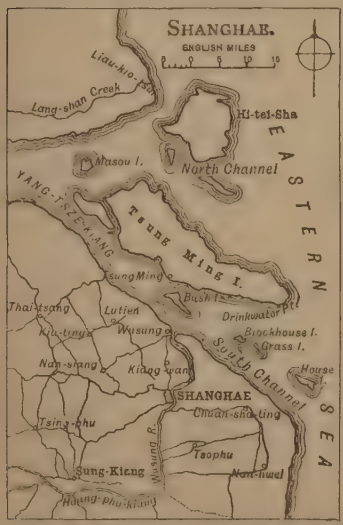
Shamoy Leather, a soft leather prepared from the skins of goats, deer, and sheep (originally the chamois, whence the name) by impregnating them with oil. This leather can be washed without losing its colour, and is put to innumerable uses.

Shampooing, the name given in the East Indies to a process connected with bathing, in which the whole body is pressed and kneaded by the hands of the attendants.

Shamrock, the name commonly given to the national emblem of Ireland. It is a trefoil plant, generally supposed to be the plant called white clover (*Trifolium repens*), but some think it to be rather the wood-sorrel (*Oxālis Acetosella*). The plant sold in Dublin on St. Patrick's Day is the small yellow trefoil (*Trifolium minus*).

Sham'yl, a Caucasian chief, was born in the north of Daghestan in 1797, and died in 1871. He studied Arabian grammar and philosophy under the Mollah Jelal-eddin, and became a disciple of Kasi-Mollah, whose revival of Sufism had formed a bond of union among the tribes of Daghestan. In 1824 he joined Kasi-Mollah in the struggle which then broke out against the Russians. In this struggle he ultimately became the elected chief, and continued to resist the Russian power until 1859 when he was captured and taken to St. Petersburg. Here he was hospitably received by the czar, who provided him with a pension and a residence.

Shanghai, or SHANGHAE (shang-hī'), a large city and seaport of China, province of Kiangsoo, on the Woosung or Whangpoo, about 12 miles above its entrance into the



estuary of the Yang-tsze-kiang. The Chinese city proper is inclosed within walls 24 feet high, the streets being narrow and dirty, and the buildings low, crowded, and for the most part unimportant. In 1843 Shanghai was opened as one of the five treaty ports, and an important foreign settlement is now established (with a separate government) outside the city walls. The Woosung here is about ¾ mile wide, and increases to over 1 mile at its outlet into the Yang-tsze, at the port of Woosung. Along the bank of the river extends a wide 'bund' or quay, with a bulwark of stone and numerous stone jetties, for landing and loading cargo. In the foreign settlement there are a fine cathedral, municipal offices, hospitals, club-house, &c. A municipal council is elected by the English and Americans, and another by the French, whose quarter is separately administered. The subjects and citizens of each nationality are under the protection of their respective consuls, and a complete judicial staff has been established, forming at Shanghai a supreme court, with jurisdiction over all British subjects in China and Japan. The Chinese authorities retain complete control over all shipping dues, duties on imports and exports, &c. Shanghai has water communication with about a third of China, and its trade since the opening of the port has become very extensive, the total of exports and imports together, native and foreign, amounting to £56,000,000 annually. The chief imports are cottons, yarns, woollens, and opium; and the exports, silk, tea, rice, and raw cotton. The largest part of the foreign trade is in the hands of British merchants. The foreign population is about 3000, and the native population is estimated at 300,000.

Shannon, the largest river of Ireland, rises at the base of Cuilcagh Mountain in County Cavan; flows S.W. and S. through loughs Allen, Boderg, Bofin, Ree, and Derg; divides Connaught from Leinster and Munster; and enters the Atlantic by a wide estuary, at the mouth of which are Loop Head in Clare and Kerry Head in Kerry; length about 250 miles. This estuary begins a little below Limerick, and is navigable by large vessels, while small craft ply nearly the whole length of the river. The chief affluents of the river proper are the Suck and Brosna. It is connected with the Royal Canal and the Grand Canal, which give a direct communication to Dublin, and also a communication south into the basins of the Barrow and Suir. The tide rises in springs 17 or 18 feet, and in neaps about 14 feet. Considerable improvements have recently been made in the navigation.

Shanny (*Pholis lævis*), a small sea-fish allied to the blenny, and found under stones and sea-weeds, where it lurks. By means of its pectoral fins it is able to crawl upon land,

and when the tide ebbs will often creep upon shore until it finds a crevice wherein it can hide until the tide returns.

Shansee', an inland province of Northern China, with an area of 65,950 sq. miles, is the original seat of the Chinese people, and in its lowland parts is well cultivated. The rivers, which are almost all tributaries of the Yellow River, are numerous, but not large. The chief grain crops are wheat and millet, and there are coal, iron, copper, and other minerals. The capital is Tae-yuen-foo. Pop. 14,000,000.

Shan States, a number of small semi-independent communities occupying a district N. of Siam and E. of Burmah, the boundary of which is not well defined. Each state is governed by a chief and a council; the nominal religion is Buddhism, and the practice of slavery is general. The people (Shans) have attained much proficiency in various handicrafts, and show great aptitude for trade. Railways are projected through the Shan States to connect the Burmese system with Siam, which if carried out will facilitate the progress and development of the country.

Shantung', a maritime province of China, on the Yellow Sea; area, 53,760 square miles. The greater portion of this province is level. The chief river is the Yellow River or Hoang-ho, which, after traversing the province in a north-east direction, flows into the Gulf of Pe-che-lee. Wheat, millet, and indigo are the chief products, and the manufactures include silk, hempen cloths, felt, &c. It was in this province that Confucius was born. The capital is Tse-nan-foo, and the pop. 29,000,000.

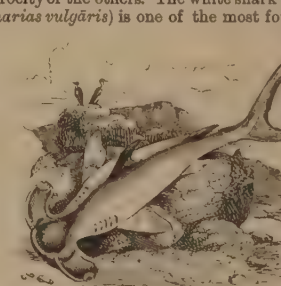
Shap'inshay, one of the Orkney Islands of Scotland, between the islands of Stronsay and Pomona. It is about 4½ miles long and 4 miles broad; area, 6733 acres, of which nine-tenths are under cultivation, and yield excellent crops of grain. The surface is generally flat, but at one point rises to the height of 162 feet. Pop. 903

Shari, a large river in Central Africa, which enters the southern side of Lake Tchad by several mouths after a course of about 700 miles from the south-east. See *Tchad*.

Shark, the general name for a group of elasmobranchiate fishes, celebrated for the size and voracity of many of the species. The form of the body is elongated, and the tail thick and fleshy. The mouth is large, and armed with several rows of compressed, sharp-edged, and sometimes serrated teeth. The skin is usually very rough, covered with a multitude of little osseous tubercles or placoid scales. They are the most formidable and voracious of all fishes, pursue other marine animals, and seem to care little

White Shark (*Carcharias vulgāris*).

whether their prey be living or dead. They often follow vessels for the sake of picking up any offal which may be thrown overboard, and man himself often becomes a victim to their rapacity. The sharks formed the genus *Squalus* of Linnæus, which is now divided into several families, as the Carcharidæ, or white sharks; Lamnidæ, or basking sharks; Scymnidæ, including the Greenland shark; Scyllidæ, or dog-fishes; &c. The basking shark (*Selachemaxima*) is by far the largest species, sometimes attaining the length of 40 feet, but it has none of the ferocity of the others. The white shark (*Carcharias vulgāris*) is one of the most formid-



Hammer-headed Shark (*Zygæna malleus*).

able and voracious of the species. It is rare on the British coasts, but common in many of the warmer seas, reaching a length of over 30 feet. The hammer-headed sharks (*Zygæna*), which are chiefly found in tropical seas, are very voracious, and often attack man. They are noteworthy for the remarkable shape of their head, which resembles somewhat a double-headed hammer,

the eyes being at the extremities. Other forms are the porbeagle, blue shark, fox shark, sea-fox, sea-ape or thresher, and Greenland or northern shark. The shark is oviparous or ovoviviparous, according to circumstances. Large numbers of sharks are caught in some places (Russian Lapland, the north of Norway) for the oil contained in their livers. See *Dog-fish*, *Porbeagle*, &c.

Sharp, in music, the sign (♯) which, when placed on a line or space of the staff at the commencement of a movement, raises all the notes on that line or space or their octaves a semitone in pitch. When, in the course of the movement, it precedes a note, it has the same effect on it or its repetition, but only within the same bar.—*Double sharp*, a character (×) used in chromatic music, and which raises a note two semitones above its natural pitch.

Sharp, James, Archbishop of Saint Andrews, was born in the castle of Banff, 1613. He studied for the church at the University of Aberdeen, and afterwards visited (1639) Oxford and perhaps Cambridge. On his return he was appointed to the parish of Crail, and was soon recognized as a leader of the moderate party in the church, on whose behalf he visited London as one of their deputies to Cromwell. He was afterwards intrusted with a mission to Monk in favour of the Restoration, and the latter sent him to Breda to meet Charles II. On his return to Scotland (1660) he was rewarded by being appointed professor of theology in St. Andrews, and chaplain to the king for Scotland. In 1661 parliament met and established Episcopacy, and he was shortly afterwards appointed archbishop of St. Andrews. His persecutions of the Covenanters made him detested by that party, and in 1679 he was waylaid and murdered on Magus Moor, Fifeshire, by a party of his enemies headed by John Balfour of Kinloch.

Sharp, William, a celebrated English line engraver, born at London in 1749, died in 1824. He first practised as a writing engraver, but ultimately followed the higher branches of his art with great success. His merit was first recognized in connection with the engraving of Stothard's designs for the Novelist's Magazine, and his chief works of large size are from paintings by Copley, West, Reynolds, Raeburn, Stothard, Romney, Salvator Rosa, and Annibal Carracci.

Sharpe, Samuel, a nephew of Rogers the poet, born 1799, died 1881. In addition to numerous biblical publications he is the author of a History of Egypt, Chronology of Ancient Egypt, and numerous monographs on hieroglyphics and Egyptian antiquities.

Shaston. See *Shaftesbury.*

Shastra, or Shaster, a law or book of laws among the Hindus; applied particularly to a book containing the authorized institutes of religion, and considered of divine origin. It is also used in a wider sense of treatises containing the laws or institutes of the various arts and sciences.

Shave-grass. See *Equisetum.*

Shawl, an article of dress usually of a square or oblong shape worn by both sexes in the East, but in the West chiefly by females. Some of the Eastern shawls, as those of Cashmere, are beautiful and costly fabrics. The usual materials in the manufacture of shawls are silk, cotton, hair, or wool. Norwich and Paisley were long famed for their shawls made in imitation of those from India. The use of the shawl in Europe belongs almost entirely to the present century.

Shaya-root. See *Chay-root.*

Shea, the *Bassia butyracea* of botanists, is a native of tropical Asia and Africa. The trunk of this tree, when pierced, yields a copious milky juice, and *shea* or vegetable butter is found in the nuts when crushed. The latter are the size of a pigeon's egg, and each tree yields about a bushel. See *Bassia.*

Sheading, in the Isle of Man, a riding, tithing, or division in which there is a coroner or chief constable. The isle is divided into six sheadings.

Shears, a kind of large scissors, consisting of two movable blades with bevel edges for cutting cloth, &c. Sometimes, as in the shears used by furriers, weavers, &c., they are made of a single piece of steel bent round until the blades meet.

Shear-tails (*Thamastura*), a genus of humming-birds, of which the slender shear-tail (*T. enicura*) and Cora's shear-tail (*T. Coræ*) are two familiar species. These birds occur, the former in Central America generally; the latter in Peru and in the Andes valleys. They derive their name from the elongation of the two central tail-feathers of the males.

Shearwater, the name of several marine birds of the genus *Puffinus.* The great shear-water (*P. cinereus*), which is 18 inches long, is found on the south-west coasts of England and Wales. They fly rapidly, skimming over the sea, from which they

pick up small fishes, molluscs, &c. The name is sometimes applied to the scissor-bill or skimmer (*Rhynchops nigra*).

Sheat-fish, a name given to the fishes of the family Siluridæ, of which the best-known species is the sly silurus or sheat-fish (*Silūrus glanis*), found in the Swiss lakes, and in Eastern European rivers. See *Silurus*.

Sheath, in botany, a term applied to a petiole when it embraces the branch from which it springs, as in grasses; or to a rudimentary leaf which wraps round the stem on which it grows.

Sheath-bill (*Chĭčnis alba*), a bird belonging to the order Grallæ. They derive their name from the horny sheath which overlies the nostrils, and is continued back until it extends in a kind of hood, thickly feathered, covering the face. In appearance and flight they are not unlike pigeons, their plumage being dazzlingly white. They inhabit the islands of the southern oceans, more especially Kerguelen's Island and the Crozets.

Sheathing, in naval architecture, is an external covering applied to the bottoms of wooden vessels to protect them from barnacles and other animal or vegetable parasites. Copper was for a long time the material frequently used, but various other metals have been recently tried, among the most successful being Muntz's metal.

Sheave, a grooved wheel in a block or pulley upon which the rope or chain works.

Sheba, anciently a region in the south of Arabia, whose queen paid a celebrated visit to Solomon.

Sheboy'gan, a town of the United States, in Wisconsin, on Lake Michigan, at the mouth of the Sheboygan river. It has a good harbour and a trade in wheat and lumber. Pop. 16,359.

Shechem, an ancient city of Palestine, situated on the watershed between the Mediterranean and the Jordan, about 30 miles north of Jerusalem, and midway between Galilee and Judæa. In the New Testament narrative it has been identified with Sychar, and is now represented by Nablus. See *Nablus*.

Shechi'nah, a term used by the Jews to indicate the cloud or visible representative of the divine presence between the cherubim of the mercy-seat of the tabernacle and afterwards of the temple of Solomon.

Sheep, a ruminant animal of the genus *Ovis*, family Capridæ, and nearly allied to the goat. It is one of the most useful animals to man, as its wool serves him for clothing, its skin is made into leather, its flesh is an excellent article of food, and its milk, which is thicker than that of cows, is used in some countries to make butter and cheese. The varieties of the domestic sheep (*Ovis aries*) are numerous, but it is not known from what wild species they were originally bred, although it is probable that the smaller short-tailed breeds with crescent-shaped horns are descended from the wild species known as the moufflon. The ordinary life of a sheep is from twelve to fifteen years; but it is usually fattened and sent to market at the age of two or three years unless its fleece be the object desired. The latter is shorn every year about the month of May. The chief English varieties of the sheep are the large Leicester, the Cotswold, the Southdown, the Cheviot, and the black-faced breeds. The Leicester comes early to maturity, attains a great size, although the mutton is not of the finest quality, and its fleece weighs from 7 to 8 lbs. The Cotswold breed, which has been improved by crossing with the Leicesters, has fine wool, and a fine grained mutton. The Southdowns are large, their wool is short, close, and curled, and the mutton is highly valued. The Cheviot is a hardier breed than any of the preceding; its wool is short, thick, and fine, while its mutton is of excellent quality. The black-faced breed is the hardiest of all, its wool is long and coarse, and its mutton is considered the finest. The Merino variety of sheep originally belonged to Spain (where in summer they feed upon the elevated districts of Navarre, Biscay, and Arragon, and winter in the plains of Andalusia, New Castile, and Estremadura), but they are now reared in other parts of the Continent, as also in Australia and New Zealand. Their wool is long and fine, but the mutton is of little value. Of the foreign breeds, which are numerous, mention may be made of the broad-tailed or fat-tailed sheep (*Ovis laticauda*), common in Asia and Egypt, and remarkable for its large tail, which is loaded with fat; the Iceland variety, which has sometimes three, four, or five horns; the fat-rumped sheep of Tartary; the Astrakhan or Bucharian sheep, the wool of which is twisted in spiral curls of a fine quality; the Wallachian or Cretan sheep, which has long, large, spiral horns; and the Rocky Mountain sheep, a native of the New World, and notable for its large horns. See *Argali*, *Bighorn*, *Moufflon*.

Sheep Bot-fly. See *Bot-fly.*

Sheep-laurel, a small North American shrub of the genus *Kalmia* (*K. angustifolia*). It is a favourite garden shrub, and receives its name from its leaves and shoots being hurtful to cattle. Called also *Lambkill.*

Sheepshanks, JOHN, art patron, born at Leeds 1787, died 1863. In 1856 he presented his fine collection of paintings, &c., to the nation, and they are now in the South Kensington Museum. They comprise 233 oil-paintings and 103 sketches and drawings by the most eminent British artists of his time.

Sheep's-head, the name of a fish (*Sparus ovis*) caught on the shores of Connecticut and Long Island. It is allied to the gilthead and the bream, and is considered a delicious food. It receives its name from the resemblance of its head to that of a sheep.

Sheep-tick, a well-known dipterous insect (*Melophăgus ovīnus*) belonging to the family Hippoboscidæ or horse-flies. The pupæ produced from the eggs are shining oval bodies which become attached to the wool of the sheep. From these issue the tick, which is horny, bristly, of a rusty ochre-colour, and wingless. It fixes its head in the skin of the sheep, and extracts the blood, leaving a large round tumour. Called also *sheep-louse.*

Sheeraz. See *Shiraz.*

Sheerness, a seaport, dockyard, and garrison town of England, county of Kent, in the Isle of Sheppey, on the river Medway, at its junction with the Thames, 47 miles east of London by rail. The harbour is safe and commodious, and the fortifications, which are modern, are of immense strength. The admiralty dockyard employs a large number of men, and is principally utilized for repairs. Sheerness has large military and naval barrack accommodation. It has now become a favourite summer resort, as it has a fine beach and excellent facilities for bathing, &c. Pop. 13,841.

Sheers, a kind of apparatus for hoisting heavy weights, consisting of two or more poles erected in a mutually inclined position, and fastened together at the top, their lower ends being separated to form an extended base. The poles are steadied by guys, and from the top depends the necessary tackle for hoisting. Permanent sheers, worked by steam, are now used at loading wharfs and in dockyards.

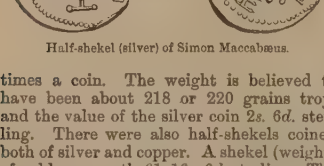
Sheet, a rope fastened to one or both the lower corners of a sail, to extend and retain it in a particular situation.

Sheffield, a municipal and parliamentary borough of England, county of York (West Riding), situated on hilly ground at the junction of the Sheaf and Don, about 160 miles north of London by rail. The site of the town was originally confined to the angle formed by the Sheaf and Don, but it now extends along the slopes above these rivers and their tributaries, the Loxley, Rivelin, and Porter. In the central parts great improvements have recently been made in the crowded streets by the corporation, and the suburban districts are well built and picturesquely situated. The chief ecclesiastical building is the ancient parish church of St. Peter's in the Perpendicular style, and recently restored. Of educational and literary institutions there are the Free Grammar School, the Church of England Educational Institute, the Firth College, the Wesley College, Ranmoor College, the School of Art, and the St. George's Museum founded by Mr. Ruskin. The principal buildings are the Town Hall, the Cutlers' Hall, the Corn Exchange, the Music Hall, and the Albert Hall. There are numerous hospitals and charitable institutions. The town is well supplied with parks, chief of these being the Norfolk, Firth, and Weston parks, the latter of which includes a museum and the Mappin Art Gallery. The trade of Sheffield is chiefly connected with cutlery, for which it has long been famous, and the manufacture of all forms of steel, iron, and brass work. The steel manufacture includes armour plating, rails, engine castings, rifles, &c. There are also manufactures of engines, machinery, plated goods, Britannia-metal goods, optical instruments, stoves and grates, &c. Parliamentary sanction has recently been given to a scheme which proposes to connect Sheffield with the port of Goole by means of a navigable highway suitable for ships. Sheffield is supposed to have been originally a Roman station. Edward I. granted it a charter as a market town in 1296, and there is indication in Chaucer's writings that the town was then noted for its cutlery. But it is only since the beginning of this century that it has developed such importance as a manufacturing centre. The chief modern event in its history was the terrible disaster in 1864, occasioned by the bursting of Bradfield Reservoir. The parliamentary divisions of the town are: Central, Attercliffe, Brightside, Hallam, and Ecclesall, for each of which it returns one member. Pop. 324,243.

Sheik (shēk or shāk), a title of dignity properly belonging to the chiefs of the Arabic tribes, but now largely used among Moslems as a title of respect. The head of the Mohammedan monasteries, and the head man of a village, are sometimes called sheiks. The chief mufti at Constantinople is the Sheik-ul-Islam.

Sheil (shēl), RICHARD LALOR, an Irish political orator, born at Drumdowney, Tipperary, in 1791; died 1851. He was educated at Stoneyhurst and at Trinity College, Dublin, and became a member of the Irish bar in 1814. Soon afterwards he produced a number of plays and wrote a series of papers called Sketches of the Irish Bar. Along with O'Connell he agitated for Catholic emancipation, and in 1831 he entered parliament as member for Louth, where he soon established his reputation as an orator. He was successively appointed vice-president of the board of trade (1839), judge advocate-general (1841), master of the mint (1846), and minister at Florence (1850).

Shek'el, a Jewish weight and in later



Half-shekel (silver) of Simon Maccabæus.

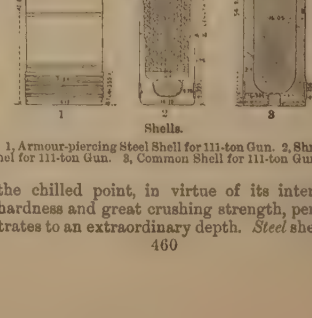
times a coin. The weight is believed to have been about 218 or 220 grains troy, and the value of the silver coin 2*s.* 6*d.* sterling. There were also half-shekels coined both of silver and copper. A shekel (weight) of gold was worth £1, 16*s.* 6*d.* sterling. The shekel of the sanctuary is supposed to have been originally worth double the common shekel.

Shelburne. See *Lansdowne.*

Sheldrake, or SHELDRAKE, the name given to two species of British ducks, namely, the common sheldrake (*Tadorna vulpanser* or *Anas tadorna*) and the ruddy sheldrake (*Casarca rutila*). They are sometimes called burrow-ducks, from their habit of making their nests in rabbit-burrows.

Shell, the name applied to the external limy covering secreted by various groups of invertebrate animals, but restricted in a scientific sense to that form of exoskeleton secreted by the mantle of the mollusca. Thus the hard coverings of crabs, sea-urchins, lobsters, foraminifera, &c., are scientifically known as 'tests,' and are not to be regarded as true shells. The shell in mollusca grows with the growth of the animal, to which it affords protection. The shell or test of a crustacean does not grow after it has once been formed, but is cast and renewed from time to time. In its most elementary form the molluscan shell exists as simply a covering to the gills. Each separate piece is termed a valve. So that when the shell consists of one piece, as in whelks, limpets, &c., it is called a *univalve;* when in two pieces, as in oysters, mussels, &c., it is called a *bivalve;* and in the Chiton family of gasteropoda it is called, because of its eight pieces, a *multivalve.* In their chemical composition shells are usually composed of carbonate of lime, mixed with a small proportion of organic matter. (See *Mollusca.*) Shells are much used in ornamental manufactures. See *Cameo, Mother-of-pearl.*

Shell, a hollow projectile filled with a bursting charge of gunpowder or other explosive composition, and fitted with a fuse to fire it at the desired point. Shells are usually made of cast-iron or steel, and for mortars or smooth-bore cannon are spherical, but for rifled guns are as a rule elongated. There are many kinds of shells.—*Common shells* are simple hollow projectiles filled with powder. On explosion they act like a mine. They are very effective in breaching earth-works or masonry. — *Palliser shells* are made of mottled iron with pointed heads, nearly solid, and chilled white by being cast in iron moulds. They are intended for use against armour-clad vessels;



Shells.

1, Armour-piercing Steel Shell for 111-ton Gun. 2, Shrapnel for 111-ton Gun. 3, Common Shell for 111-ton Gun.

the chilled point, in virtue of its intense hardness and great crushing strength, penetrates to an extraordinary depth. *Steel* shells

of similar power have also been made.—*Shrapnel shells* are shells filled with bullets, and with a small bursting charge just sufficient to split the shell open and release the bullets at any given point.—*Segment shells* are of the nature of shrapnel. They contain iron segments built up round the inside of the shell. From their construction they are inclined to spread much more than shrapnel on bursting, and they should consequently be fired to burst close to the object. With percussion fuzes great results are produced.

Shelley, Mary Wollstonecraft, the second wife of the poet Shelley, was the daughter of William Godwin and Mary Wollstonecraft, and was born in London 1797, died 1851. She married Shelley in 1816, after having lived with him two years previously to the death of his first wife. Her romance of Frankenstein, which excited an immense sensation, was published in 1818, when she was at most twenty-one years old. Left by her husband's death, in 1822, with two young children to support, she devoted herself for many years to literary composition, producing Valperga, The Last Man, and other works. In 1840–41 she edited Shelley's works, with preface and biographical notes.

Shelley, Percy Bysshe, born at Field Place, Horsham, Sussex, 4th August, 1792, was the son of Sir Timothy Shelley, a landed proprietor of ancient family, and was educated at Sion House School, Brentford, at Eton, and at University College, Oxford. Of a delicate constitution he was early characterized by an extreme sensibility and a lively imagination, and by a resolute resistance to authority, custom, and every form of what he considered tyranny. At Eton he put himself in opposition to the constituted authorities by refusing to submit to fagging. At Oxford, in his second year at the university, he published anonymously, apparently as a challenge to the heads of the colleges, to whom it was sent, a scholastic thesis entitled A Defence of Atheism. The authorship being known he was challenged, and refusing either to acknowledge or deny it was at once expelled. After leaving the university he completed his poem of Queen Mab, begun some time previously, and privately printed in 1813. His first great poem, Alastor, or the Spirit of Solitude, saw the light in 1816; and this was followed, in 1817, by the Revolt of Islam, a poem in the Spenserian stanza. In Sept. 1811, six months after his expulsion, he eloped to Edinburgh with Harriet Westbrook, the daughter of a retired innkeeper. She was sixteen years of age, his own age being nineteen. The marriage turned out unhappily, and after nearly three years of a wandering unsettled life Mrs. Shelley returned with two children to her father's house. In Nov. 1816 she committed suicide by drowning. Shelley was deeply affected by this event, but soon after married Mary Godwin, with whom he had visited the Continent in 1814, and by whom he already had a child. By a suit in Chancery decided in 1817, Mr. Westbrook obtained the guardianship of the children, on the plea that his atheistical opinions and irregular views on marriage made the father unfit to be intrusted with them. Partly from his lungs being affected, and partly from anxiety lest he should be deprived of the children of his second marriage, Shelley left England finally in March 1818, and the whole short remainder of his life was passed in Italy. After staying for some time with Lord Byron at Venice he proceeded to Naples; after Naples he visited Rome; and from Rome he went to Florence and Leghorn, and finally settled at Pisa. On the 8th of July, 1821, he was sailing along with a Mr. Williams in the Bay of Spezia when both were drowned by, as was long believed, the upsetting of the boat through a sudden squall; but there is some suspicion that the boat was purposely run down by an Italian felucca for the sake of plunder. According to the quarantine laws of Tuscany the bodies were burned, and the ashes of Shelley were deposited by his friends in the Protestant burying-ground of Rome. Apart from special causes of alienation Shelley's poetry would never have been popular with the mass of readers; even although in strength of imagination and fertility of fancy, particularly in the power of impersonation, as well as in command of language and appreciation of the beautiful in poetic art, he has had few rivals. The most popular of his works are his minor poems, which appeared from time to time along with his larger pieces, particularly the Cloud and the Skylark. His principal poems, besides those already mentioned, are Rosalind and Helen, and Julian and Maddalo (the latter a poem recording some of his intercourse with Byron), produced in 1818; the Cenci and the Prometheus Unbound, in 1819; the Witch of Atlas, in 1820; and the Epipsychidion, the Adonais (an elegy on Keats), and the Hellas, in

1821. Many memoirs of Shelley have appeared, the best of which is the Life by Prof. Ed. Dowden published in 1886.

Shell-lac, or SHELLAC. See *Lac.*

Shem, the eldest son of Noah, and ancestor of Abraham, who was the eighth in descent from him according to the genealogies in the book of Genesis.

Shem'aha, a town of Russia, in Transcaucasia, about 70 miles north-west of Baku. In recent times it has suffered severely from earthquakes. Silk manufacture is the principal industry. Pop. 25,000.

Shemitic Languages. See *Semitic Languages.*

Shenando'ah, a town of the United States, in Schuylkill county, Pennsylvania, 12 miles N. of Pottsville. Founded in 1863, it is the centre of a great coal district. Pop. 15,944.

Shenandoah, a river of the United States, which flows north-east through the valley of Virginia, and immediately below Harper's Ferry joins the Potomac, of which it is the principal tributary. Its length is 170 miles, the greater part of which is navigable for boats. The valley of the Shenandoah was the scene of numerous military operations in the American civil war, and was devastated by General Sherman in 1864.

Shendy, a town of Nubia, on the Nile, between Berber and Khartum, is a depôt for the caravan traffic with Kordofan. From Shendy light-draught steamers can pass readily to Khartum. Pop. 6000.

Shen-se, a province of China, bounded on the north by the Great Wall, and on the east by the Yellow River; area, 80,900 sq. miles. It is purely an agricultural province. From Se-gan Foo, the provincial capital, and anciently the capital of the empire, radiate a number of roads going east, south, and west, and Shen-se is the great channel of communication between China and Central Asia. Pop. 8,276,967.

Shen'stone, WILLIAM, English poet, was born at Leasowes, in the parish of Halesowen, Worcestershire, in 1714, studied at Pembroke College, Oxford, and passed his life in retirement on his small paternal estate of Leasowes, beautifying it, and writing odes, elegies, ballads, and pastorals, which had considerable popularity. He now holds his place in literature chiefly by his Pastoral Ballads and his Schoolmistress, in the Spenserian stanza, published in 1742. He died in 1763.

Sheol, a Hebrew word frequently occurring in the Old Testament, and rendered in the Septuagint by 'hades,' in the Authorized Version by 'grave,' 'pit,' and 'hell,' but in the Revised Bible of 1885 never, except in one instance, by the last term. It was, as originally conceived, the gloomy under-world, the abode of the ghosts or spirits of the dead. No retributive idea was connected with it until the time of the exile. See *Hell.*

Shepherd Kings. See *Hycsos.*

Shepherd's Dog, a variety of dog employed by shepherds to assist in tending the flocks, remarkable for its intelligence and usefulness. It is generally of large size, and of powerful, lithe build. The tail is inclined to be long, and possesses a bushy fringe. The muzzle is notably sharp. The eyes are large and bright. The limbs are strongly made, and the whole frame betokens an adaptation to an open, out-door life. Of all strains of shepherd's dog the Scotch collie or colley is the most celebrated. See *Collie.*

Shepherd's Purse (*Capsella bursa pastōris*), a plant of the natural order Cruciferæ. It is an annual weed, found in all temperate climates, having simple or cut leaves and small white flowers. In Britain it occurs in all situations up to 1200 feet.

Shep'pey, an island of England, in the county of Kent, at the mouth of the Thames, between the estuaries of the Medway and the Swale. It is 9 miles long and 5 broad, is rich and fertile, and contains the town of Sheerness. Pop. 18,607.

Shepton-Mallet, a town of England, in Somersetshire, 4½ miles east of Wells. It has a remarkably handsome market-cross, erected about 300 years ago, and a church with a fine tower 120 feet high. The manufactures comprise silk, velvet, crape, ribbons, &c., but brewing is now the principal industry. Pop. 5501.

Sherbet, a beverage of the orientals, made of water, sugar, lemon-juice, rose-water, dried fruits, or similar ingredients.

Sher'borne, a town of England, in Dorsetshire, 18 miles N.N.W. from Dorchester. It is a place of great antiquity, having been the seat of a bishopric from 705 till 1078. The church of the ancient abbey, founded in 998, is one of the finest minsters in the south and west of England. It is partly Norman, but chiefly Perpendicular. There are here also ruins of a castle, dating from the time of Stephen. The grammar-school is a large and flourishing public school. Pop. 3741.

Sher'brooke, a town of Quebec prov., Canada, capital of county of same name, 100 miles E. of Montreal, on both sides of

the river Magog. It is a flourishing place, with manufactures of tweeds and other industries, for which its extensive water-power is utilized. Pop. 10,110.

Sher'brooke, THE RIGHT HON. ROBERT LOWE, VISCOUNT, son of the Rev. Robert Lowe, rector of Bingham, Notts, was born at Bingham in 1811, and was educated at Winchester and at University College, Oxford. In 1842 he was called to the bar, and the same year he emigrated to Australia, whence, after a successful career both as a barrister and a politician, he returned to England in 1851. He was M.P. for Kidderminster (1852–59), for Calne (1859–68), and for the University of London (1868–80). He was joint-secretary of the Board of Control (1852–55), vice-president of the Board of Trade and paymaster-general (1855–58), president of the Board of Health, and vice-president of the Educational Committee of the Privy Council (1859–64), and chancellor of the exchequer (1868–73). In August 1873 he succeeded Mr. Bruce at the Home Office, and in Feb. 1874 went out of office with his party. On the return of the Liberals to office in May 1880 he was raised to the peerage by the title of Viscount Sherbrooke. His Poems of a Life appeared in 1885. Died in 1892.

Shere Ali Khan, Amir of Afghanistan, was born about 1823, and succeeded his father, Dost Mohammed, in 1863. During the earlier part of his reign he passed through many vicissitudes, but by 1868 he was fully established on the throne of Kabul. In 1869 he entered into friendly relations with the Indian government. These friendly relations continued till 1878, when a Russian mission was received with honour at Kabul, while shortly afterwards permission was refused for a British mission to cross the frontier. Thereupon the British invaded Afghanistan and took possession of the Khaiber Pass and the Kuram Valley. Shere Ali fled from Kabul, accompanied by the members of the Russian mission, and in 1879 died, a fugitive, in Afghan Turkistan. He was succeeded by his second son, Yakub Khan, who, however, on account of the Cavagnari massacre, was speedily deposed and deported to India, and was succeeded by his cousin, Abdur Rahman Khan, in 1880.

Sher'idan, PHILIP HENRY, American general, and the greatest cavalry leader produced by the American civil war, was born at Somerset, Ohio, in 1831, graduated at the Military Academy, West Point, in 1853, and from 1855 to 1861 served on the frontiers of Texas and Oregon. At the outbreak of the civil war he was a captain in the 13th Infantry. Having greatly distinguished himself in the earlier battles of the war, in April 1864 Grant appointed him chief of cavalry of the Army of the Potomac, and he made several daring cavalry raids into the South. His rush from Winchester to Cedar Creek, a distance of 20 miles, in Oct. 1864, which turned a Federal defeat into a brilliant victory, is known as 'Sheridan's Ride.' During the final advance upon Richmond he was Grant's right-hand man; he fought the battle of Five Forks, which necessitated Lee's evacuation of Richmond and Petersburg; and as Lee fled he constantly harassed and attacked him until he compelled his surrender at Appomattox Courthouse, April 9, 1865. After the war he held various military commands. In March 1869 he became lieutenant-general, and in Feb. 1884, on the retirement of Sherman, he succeeded to the command of the army. He died August 5, 1888. An account of his military career, written by himself, appeared in 1889.

Sheridan, RICHARD BRINSLEY BUTLER, was born at Dublin in 1751, his father being Thomas Sheridan, actor, and latterly teacher of elocution. (See next article.) He was sent for a short time to a school in Dublin, and in 1762 to Harrow, where he did not distinguish himself. In 1772 he eloped to France with Miss Linley, a young singer of great beauty and accomplishments. Shortly before his marriage he had entered at the Middle Temple, but his studies were prosecuted with little assiduity, and he was never called to the bar. Without means or a profession he applied himself to composition for the stage, and on 17th January, 1775, brought out The Rivals, which, after a temporary failure from bad acting, attained a brilliant success. On 21st Nov. he produced the comic opera, The Duenna, which had a run of seventy-five nights, an unprecedented success. In 1776 he managed to find money to become one of the proprietors of Drury Lane Theatre, where, in 1777, appeared The School for Scandal, his most famous comedy, and in 1779 The Critic, a farce, which like The Duenna and The School for Scandal was a model of its kind, and shared in their brilliant success. His dramatic reputation, and especially his social gifts, brought him into intimacy with Fox,

Burke, Windham, and other Whig leaders, and in 1780 Fox got him returned to parliament for Stafford. In 1782 he became under-secretary of state; in 1783 secretary of the treasury; in 1806 treasurer of the navy and privy-councillor. He never became a statesman, but his fame soon rose high as an orator. His greatest effort was his 'Begum' speech on the impeachment of Warren Hastings (1787), which Pitt said 'surpassed all the eloquence of ancient and modern times.' His wife died in 1792. In 1795 he married Miss Ogle, a daughter of the Dean of Winchester, with whom he received a considerable accession of means. He was on terms of intimacy with the Prince of Wales (afterwards George IV.), which did not improve his naturally dissolute and extravagant habits. His parliamentary career ended in 1812, and the remainder of his life was constantly harassed by debt and disappointment. He died in 1816, having narrowly escaped arrest for debt on his death-bed. Sheridan's plays are especially distinguished for their wit, which, though brilliant, is easy and natural. In plot and character there is little originality, but admirable selection. His wit was studiedly polished and refined, and what he borrowed was, if not improved, always at least brilliantly set.

Sheridan, Thomas, D.D., grandfather of R. B. Sheridan, born 1684, died 1738. He was a close friend and confidant of Swift's, and was noted for his learning and eccentricities. He wrote the Art of Punning, and published an edition of Persius.—His son, Thomas, father of the dramatist, born 1721, died 1788, was educated at Westminster School and Trinity College, Dublin. He became an actor and teacher of elocution, and published a Plan of Education, Life of Swift, and a Dictionary of the English Language.—His wife, Frances Chamberlaine (1724-66), was the author of two novels, Sidney Biddulph and Nourjahad; and two plays, The Discovery and The Dupe.

Sherif', an Arabic title equivalent to noble, borne by the descendants of Mohammed. It descends both in the male and female line. Those who possess this rank are distinguished by green turbans and veils, green being the colour of the Prophet. The title is applied specifically to the chief magistrate of Mecca.

Sheriff, in England, the chief officer of the crown in every county, appointed annually. The custody of the county is committed to him by letters-patent, and he has charge of all the business of the crown therein. During his tenure of office he takes precedence within the county of any nobleman, and is entitled to sit on the bench with the justices of assize. The person appointed is bound under a penalty to serve the office, except in specified cases of exemption or disability, but a person who has served one year is not liable to serve again till after an interval of three years if there be another sufficient person in the county. The sheriff is specially intrusted with the execution of the laws and the preservation of the peace, and for this purpose he has at his disposal the whole civil force of the county—in old legal phraseology the *posse comitatus*. The most ordinary of his functions, such as the execution of writs, he universally performs by a deputy called under-sheriff, while he himself only performs in person those duties which are either purely honorary, such as attendance upon the judges on circuit, or which are of some dignity and public importance, such as presiding over elections and holding county meetings, which he may call at any time. Since the time of Henry I. the Liverymen of London have, on Midsummer Day, elected two sheriffs, who have been jointly sheriff of Middlesex, but by the Local Government Act of 1888 it is provided that while the city of London may continue a separate county, with its own sheriffs, these shall no longer be jointly sheriff of Middlesex, and that the county of London shall have a sheriff of its own. The office of sheriff was formerly hereditary in some counties, and continued so in Westmoreland till the death of the last hereditary sheriff, the Earl of Thanet, in 1849.

In Scotland there are three degrees of sheriffs, all of whom are appointed *ad vitam aut culpam*. The highest sheriff is the lord-lieutenant of the county; but as sheriff his office is merely nominal. The sheriff-depute, appointed by the crown, is now known as *the* sheriff, or sheriff-principal, and is the chief judge of the county. Under him are one or more sheriffs-substitute, who are the resident judges ordinary of the county, and are also appointed by the crown. The greater part of the duties of the office practically rests with the sheriffs-substitute, who have a rather wide jurisdiction in both civil and criminal cases. The sheriff-principal is usually an advocate practising in Edinburgh. There are also honorary sheriffs-substitute,

who in minor cases may act for the sheriff-substitute in his absence. There is an appeal from the decisions of the sheriffs-substitute to the sheriff-principal, and from him to the Court of Session. In the United States the sheriff is a very different functionary, not holding the position of a judge at all, but acting as the highest peace officer of his county, having to pursue and arrest criminals, to carry out sentences, to take charge of the jail, &c.

Sheriff-clerk, in Scotland, the clerk of the sheriff's court who has charge of the records of the court. He registers the judgments of the court, and issues them to the proper parties. There is a principal sheriff-clerk appointed by the crown for each county, and one or more depute-clerks under him.

Sheriffmuir, or SHERIFF MOOR, a place in Scotland, in the parish of Dunblane, in Perthshire. Here an indecisive battle was fought between the troops of George I. under the Duke of Argyle, and a rebel force of the adherents of the Stuarts under the Earl of Mar, in 1715.

Sherlock, THOMAS, D.D., Bishop of London, the son of Dr. Wm. Sherlock, dean of St. Paul's, was born in London in 1678, was educated at Catharine Hall, Cambridge, and succeeded his father as master of the Temple in 1704. In 1728 he was appointed to the see of Bangor; in 1734 he was translated to the see of Salisbury; and in 1748 (having refused the primacy) to the see of London, where he remained till his death in 1761. He was the author of several controversial works on Christian evidences, including The Use and Intent of Prophecy (1725), The Trial of the Witnesses of the Resurrection of Jesus (1729), and published four vols. of his discourses at the Temple Church (1754–58), which gained him a high reputation as a pulpit orator.

Sherlock, WILLIAM, D.D., Dean of St. Paul's, was born in Southwark, 1641, studied at Eton and at Peterhouse, Cambridge; became rector of St. George, Botolph Lane, London, in 1669; prebendary of St. Paul's, 1681; master of the Temple, 1684; and dean of St. Paul's, 1691. At first he refused the oaths to William and Mary, but subsequently took them. He was the author of numerous theological and controversial works, including a Practical Discourse Concerning Death (1690); a Vindication of the Doctrine of the Trinity (1691), being a reply to Dr. South; and a Treatise on the Immortality of the Soul (1704). He died at Hampstead in 1707.

Sherman, a city of the United States, in Grayson county, Texas, 73 miles N. of Dallas. It is the centre of a cotton and grain district. Pop. 7335.

Sherman, WILLIAM TECUMSEH, American general, was born at Lancaster, Ohio, 1820, graduated at the military academy, West Point, in 1840, and served in Florida, Mexico, and elsewhere till 1852, when he resigned his commission. On the breaking out of the civil war he offered his services to the U. S. government, and was appointed colonel of the 13th Regiment of Infantry. He was present at the battle of Bull Run, greatly distinguished himself at Shiloh, and subsequently took a prominent part in the operations under Grant around Vicksburg and Memphis. In March 1864 he succeeded Grant as commander of the military division of the Mississippi, and at the beginning of May, simultaneously with Grant's advance in the east, he entered upon his invasion of Georgia. On September 2, after a number of battles, he received the capitulation of Atlanta, and on December 21, of Savannah; and then turning northwards into the Carolinas and fighting more battles, he received the surrender of General J. E. Johnston, at Durham station, April 26, 1865, a surrender which brought the war to a close. Sherman was made a major-general in August 1864, lieutenant-general in July 1866, and general and commander-in-chief in March 1869. He was retired in 1884. His military career is detailed in his Memoirs, written by himself, and published in 1875. He died in 1891.

Sherry, a Spanish wine made in the neighbourhood of Xeres de la Frontera, in the province of Andalusia, near Cadiz. The soil of the best vineyards consists chiefly of carbonate of lime, with a small admixture of silex and clay, and occasionally magnesia. The dry sherry is the most esteemed, the finest variety being the Amontillado sherry. The sherry wines are shipped for the most part at Cadiz, and are principally exported to England. No wine is more largely imitated and adulterated than sherry.

Sherwood Forest, an ancient royal forest in Nottinghamshire, celebrated for the exploits of Robin Hood and his followers. The forest proper was the district between Nottingham and Worksop, extending about 25 miles north to south, and 6 to 8 east to west.

Shetland, or ZETLAND, an insular county of Scotland, about 50 miles N.E. of Orkney; area, 352,876 acres. It consists of about ninety islands and islets, of which twenty-nine are inhabited, the largest being the following:—Mainland, Yell, Unst, Whalsey, Fetlar, and Bressay, the first occupying about three-fourths of the whole area of the group. The coasts are generally bold and precipitous, presenting cliffs broken into the most rugged and fantastic forms, and attaining in Foula the height of 1200 feet above the sea. Their deep creeks and sounds form a succession of noble natural harbours. The interior is not very elevated, the highest summit, Rooness Hill, in the north of Mainland, rising only 1476 feet, but it is extremely wild and rugged. The soil, where the surface is flat, is generally mossy, but alluvium of good quality is not uncommon along some of the bays and in the small vales, and a considerable quantity of tolerable land has been made by long culture. The principal crops are black oats, bere, turnips, and potatoes. There is almost a total absence of trees. The live stock, including cattle, horses, and sheep, were until recent years remarkable for their diminutive size, but these animals have been improved in size and value by crossing them with breeds from the south. The Shetland pony is well known, and is not surpassed by any horse of its dimensions for strength and hardihood. The fisheries, especially the herring-fishery, are very valuable, and afford the chief employment. The knitting of woollen articles may be said to be the only native manufacture. For parliamentary purposes Shetland unites with Orkney in returning one member. The only town is Lerwick. Pop. 28,711.

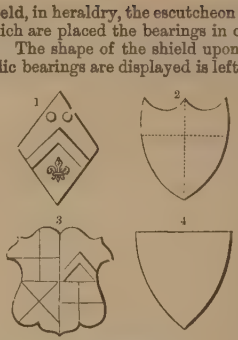
Shiahs. See *Shiites.*

Shib'boleth, a word which was made by Jephthah the criterion to distinguish the Ephraimites from the Gileadites at the fords of Jordan. See Judges xii.

Shiel, LOCH, a fresh-water lake in Scotland, on the boundary between Inverness-shire and Argyleshire. It is about 15 miles long, but extremely narrow. It discharges by the river Shiel, which flows 3 miles N.W. to the sea at Loch Moidart.

Shield, a piece of defensive armour, borne on the left arm. Shields gradually disappeared with the introduction of firearms, but the target and broadsword were the favourite arms of the Scotch Highlanders up to the middle of the 18th century. See *Arms and Armour.*

Shield, in heraldry, the escutcheon or field on which are placed the bearings in coats of arms. The shape of the shield upon which heraldic bearings are displayed is left a good



Shields.
1, Lozenge-shield. 2 and 3, Fanciful forms. 4, Spade shield—the best heraldic form.

deal to fancy; the form of the lozenge, however, is used only by single ladies and widows. The shield used in funeral processions is of a square form, and divided per pale, the one half being sable, or the whole black, as the case may be, with a scroll border around, and in the centre the arms of the deceased upon a shield of the usual form. See *Heraldry.*

Shield-fern, a common name for ferns of the genus *Aspidium*, natural order Polypodiaceæ, so named from the form of the indusium of the fructification, which is roundly-peltate or kidney-shaped. Several are natives of Britain, among which is the fragrant shield-fern (*A. fragrans*), sometimes employed as a substitute for tea.

Shields, NORTH, a town and port of England, in Northumberland, on the north bank of the Tyne, near its mouth in the German Ocean, forming part of the municipal and parliamentary borough of Tynemouth, the whole of which is popularly called North Shields. Pop. 21,598. See next article and *Tynemouth.*

Shields, SOUTH, a municipal and parliamentary borough of England, in the county of Durham, near the mouth of the Tyne, opposite to North Shields, and communicating with it by steam-ferry. The industries comprise glass, earthenware, alkali and chemicals, cordage, steam-engine boilers, and chain-cables and anchors, besides shipbuilding. The ports of North Shields and South Shields, formed by an expansion of the river into a wide bay, have been greatly

improved and deepened by dredging and the construction of piers, and are capable of containing vessels of any size at their quays. They carry on a very extensive trade, particularly in coal from the extensive collieries in the vicinity. South Shields was made a parliamentary borough in 1832, and a municipal borough in 1850. It returns one member to parliament. Pop. 78,431.

Shiffnal, a market town of England, in Shropshire, 17 miles E. of Shrewsbury. It is a place of great antiquity, picturesquely situated, and has a fine old church. Most of the inhabitants are employed in the coal and iron industries. Pop. 3531.

Shiites (shī'ītz), one of the two great sects of Mohammedans, who do not acknowledge the Sunna as a law, and believe that Ali, the fourth caliph after Mohammed, was his first lawful successor. The Persians are Shiites. See *Sunnites*.

Shikarpur', chief town of Shikarpur District, Sind Province, Bombay Presidency, India, 18 miles west of the Indus and 26 south-east of Jacobabad. It is an emporium for transit trade between the Bolan Pass and Karachi, but has lost much of its commercial importance since the opening of the Indus Valley Railway. The principal manufactures are carpets and coarse cotton cloth. Pop. 42,004.

Shikohabad', a town of India, in the North-western Provinces, Mainpuri District, 34 miles W. of Mainpuri town. It is the birthplace of several Hindu and Mussulman saints, and contains numerous temples and mosques. It has manufactures of sweetmeats and cotton cloth, and was formerly a great emporium for raw cotton. Pop. 11,826.

Shilling, an English silver coin, equal in value to 12 bronze pence or one-twentieth of a pound sterling, and approximate in value to 25 American cents, to 1·25 French francs, and to 1·11 German marks.

Shillong, a town of India, in the Khasi and Jaintia Hills District, the administrative capital of the province of Assam, on the Brahmaputra. It is a sanatorium, being situated on a table-land 4900 feet above sea-level. Pop. 6700, now rapidly increasing.

Shiloh, BATTLE OF, one of the most memorable battles of the American civil war. Shiloh is in Tennessee, 2 miles west of Pittsburg Landing, on the Tennessee river, and took its name from a log chapel known as 'Shiloh church.' The battle was fought on the 6th and 7th of April, 1862, Grant and Sherman leading the Federals, and A. S. Johnston and Beauregard the Confederates. The first day the Confederates, taking the Federals by surprise, drove them from their lines, with heavy loss in men and guns; but the second day the Federals, having received reinforcements, and largely outnumbering the Confederates, regained their lines, and forced the Confederates to retreat to their former position at Corinth.

Shimo'ga, chief town of Shimoga District, Mysore State, Southern India, 171 miles N.W. of Bangalore. Pop. 12,040.—Area of district, 3797 square miles; pop. 499,728.

Shimonoseki. See *Simonoseki*.

Shin, LOCH, a lake of Scotland, in the south of Sutherlandshire, stretching north-west to south-west about 24 miles, with an average breadth of about 1 mile, and discharging itself by the Shin, which falls into the Kyle of Sutherland.

Shing-King. See *Leaotong*.

Shingle, a thin piece of wood resembling a roofing slate, and used for the same purpose and in the same way. In Canada and the United States, and other places where timber is plentiful, shingles are extensively used for a roof-covering. They are usually cut by ingenious machinery devised for the special purpose.

Shingles (L. *cingulum*, a belt), an eruptive skin disease (*Herpes zoster*), which usually starts from the backbone and goes half round the body, forming a belt of inflamed patches, with clustered vesicles. It rarely encircles the body, though the popular opinion that if it does it will prove fatal is a delusion. It is sometimes produced by sudden exposure to cold after violent exercise, and sometimes follows acute affections of the respiratory organs. It seems to depend upon abnormal nervous action, as it frequently marks out upon the surface the part of the integument supplied by some one branch of a nerve. It is usually attended with more or less neuralgic pain and fever. It is a self-limited or cyclical disease, usually running its course in about a fortnight.

Shinto'ism, one of the two great religions of Japan. In its origin it was a form of nature worship, but the essence of the religion is now ancestor worship and sacrifice to departed heroes.

Shiogoon', or TYCOON', the title of the hereditary military ruler of Japan for many centuries till the revolution of 1868, which reinstated the Mikado in power. See *Japan*.

Ship, in the most general sense, a vessel intended for navigating the ocean. In contradistinction to boat, which is the most general term for a navigable vessel, it signifies a vessel intended for distant voyages. Ships are of various sizes, and fitted for various uses, and receive various names, according to their rig and the purposes to which they are applied, as man-of-war ships, transports, merchantmen, barques, brigs, schooners, luggers, sloops, xebecs, galleys, &c. The name as descriptive of a particular rig, and as roughly implying a certain size, has been used to designate a vessel furnished with a bowsprit and three or four masts, each of which is composed of a lower-mast, a top-mast, and a top-gallant mast, and carrying a certain number of square sails on each of the masts. These masts are named, beginning with the foremost, the fore, the main, and mizzen masts; and when there is a fourth it is called the jigger-mast. The principal sails are named according to the masts to which they belong. (See *Sails.*) Owing to increase of size and the development of steam navigation the restricted application of the term ship is now of little value.

There were two primitive types of ship-building from one or other of which, or rather perhaps from a joint development of both, all the improvements of modern times have proceeded. These were the raft and the canoe: the one, formed by fixing together planks and spars, gave a floating surface strong and buoyant enough to support a cargo; the other, made by hollowing out the body of a tree and sharpening the ends, gave with little constructive art the rude model of a form fitted for navigation. In like manner there have been from time immemorial two distinct modes of propulsion, by oars and sails.

The ancient art of ship-building, like many other arts, was lost in the overwhelming tide of barbarism which overthrew the last of the great empires of antiquity. The ruder nations of Europe had to begin again in great measure on their own resources. The war galley of the ancients may possibly be so far preserved in the mediæval galleys applied to the same purpose. On the Mediterranean, too, an unbroken line of coasting ships may probably have continued to sail. But it appears evident that the progress made in ship-building under the Roman Empire, not to speak of the Phœnicians and other earlier navigators, was much greater than was transmitted to mediæval Europe. Ship-building made little progress in Europe till the discovery of the compass, which was introduced in a rude form in the 12th century, and had been improved and had come into common use in the 14th century. The opening up of the passage to India and the discovery of America made another epoch in its progress. In the building of large vessels the Spaniards long took the lead, and were followed by the French, who specially distinguished themselves in the theoretical study of the art. In the early progress of the art of ship-building the English took little or no part. When Henry VII. built the *Henry Grace de Dieu*, which is regarded as the parent of the British navy, the English were greatly inferior to the nations of Southern Europe both in navigation and in ship-building. In the reign of Elizabeth the English fleet proved its superiority to that of Spain in respect of fighting capacity, but it was afterwards rivalled by that of Holland. Rapid improvement was made in ship-building during the 17th and 18th centuries in England as well as the maritime states of the Continent. The first three-decker was built in England in 1637. She was called the *Sovereign of the Seas*, and was deemed the best man-of-war in the world. In 1768 the French adopted three-deckers; and from their application of science they acquired a decided superiority in the size and models of their ships over the English. In the early part of the present century the lead in improvement was taken by the United States. English builders were at first sceptical as to American improvements; but in 1832 Scott Russell theoretically established the principles on which speed in sailing depends—principles which had already been practically applied not only by the Americans but by the Spaniards. From the time of their theoretical establishment they were rapidly adopted in England, and a race of improvement began between Great Britain and America. The true principles of construction both in build and rig were exemplified in the celebrated Baltimore clipper schooners, which were sharp in the bow, deep in the stern, of great length, and lying low in the water, with long, slender masts, and large sails cut with great skill. The same principles were afterwards applied to square-rigged vessels, and produced the English and American clipper ships which did so

much to develop the trade of India, China, and Australia with both Europe and America.

A great change came over the art of ship-building when steam was introduced and wood gave place to iron and then to steel. The first steamer built expressly for regular voyages between Europe and America was the *Great Western*, launched in 1837. She was propelled by paddles, but about the same time Ericsson invented his screw-propeller, which was soon adopted in sea-going ships, and the British Admiralty possessed a screw vessel in 1842. (See *Screw-propeller.*) Iron vessels were built early in the present century for canal service, then for river service, and later for packet service on the coasts. About 1838 iron vessels were built for ocean service, but the first ocean-going steamship in its present form, built of iron and propelled by the screw, was the *Great Britain*, launched in 1842. Compound engines (first introduced by Messrs. Randolph, Elder, & Co. of Glasgow, in 1854), with high-pressure steam, were not used in the Royal Navy till 1867 (in the *Sirius*). And so the progress of steam navigation is marked by special types of vessels built from time to time. (See *Steam Navigation.*) The use of iron and steel in the construction of ships has made Britain, where there is such an unlimited supply of iron, and such skill in working it, the home of ship-building. This industry formerly had its seat at the ports where suitable timber was most accessible, but is now to be found chiefly at those where the coal and the iron are near. Thus the Clyde, the Tyne, and the Wear have become the principal centres of ship-building. In recent years the shipping launched in the United Kingdom has usually exceeded 1,000,000 tons, about nine-tenths of this tonnage being steamers. Many of the vessels belonging to the great ocean lines are splendid specimens of naval architecture, some of them being 600 feet in length, having a capacity of 10,000 or 12,000 tons or even more, and with engines working up to 20,000 or 30,000 horse-power. The largest vessels are all propelled by steam, but very large sailing vessels are now constructed also, especially since it became not uncommon to fit them with four, and even five masts.

An iron vessel is lighter than a wooden one of the same size, and with iron the same strength may be obtained with less weight. Iron is also far more manageable than wood, as it can be bent with ease into any required shape. Steel, which is now superseding iron for building ships, is a still lighter material and is equally manageable. In wooden ships the keel forms the base of the whole structure; from it rise on either side a large number of *ribs*, consisting of strong timbers usually built up of several pieces, and having the requisite curvature according to the shape of the vessel; to the ribs are attached by bolts or wooden pins the planks that form the outer skin or covering, the interstices between the planks being made water-tight by caulking; internally beams extend from side to side to support the deck or decks. In steel or iron ships the keel is of far less importance than in wooden ships, and does not as in them hold the position of foundation or 'back-bone' to the whole structure, since an iron vessel ought to be mutually supporting throughout. The keel is constructed of plates riveted together, and sometimes is made hollow. From it, and riveted to it on either side, rise the ribs, which are girders built up of plates, and to the ribs on the outside is fastened the plating. The plating consists of sheets of iron-plate overlapping each other at the edges, where they are riveted together. There may be an inner skin of plating as well as an outer. The ribs are tied together and at the same time held apart by beams of iron, which support the deck or decks. The decks consist of wooden planking with thin metal plates below. In the finer class of ships there are water-tight partitions or bulkheads of iron stretching across the vessel from side to side and from keel to deck, with water-tight doors in them, so that if in case of accident water gets into one of them the rest may keep the ship afloat. Sometimes there is also a bulkhead extending lengthwise. For the modern type of war-vessels see *Iron-clad Vessels.* See also *Navigation*, *Compass*, *Log*, *Navy*, *Sail*, &c.

Ship Canal, a canal for the passage of sea-going vessels. Ship canals are intended either to make an inland, or comparatively inland place, a seaport, or to connect sea with sea, and thus obviate a long ocean navigation. Of the former kind are the Manchester Ship Canal, making that city a seaport, and the Amsterdam Canal, which gives Amsterdam a direct passage to the North Sea at Ymuiden. Of the latter kind are the Suez Canal, the Caledonian Canal, the North Sea and Baltic Canal, and (not yet completed) the Panamá Canal, Nicaragua

Canal, &c. The Caledonian Canal was formed by the British government for military purposes. It is a good example of a ship canal which traverses high districts and surmounts the elevation by locks. The Suez Canal (1860-69) is the greatest of all ship canals yet complete. It has no locks whatever, and communicates freely with the sea, connecting the Mediterranean with the Red Sea, 88 miles, and reducing the length of the voyage from London to India from 11,379 to 7628 miles. The Panamá Canal, designed to connect the Atlantic Ocean with the Pacific, will, if completed, be the greatest engineering work of the kind the world has ever seen. See the separate articles.

Shipka Pass, a pass in the Balkans, about 4600 feet above the sea, the scene of a desperate and bloody ten days' struggle during the Russo-Turkish war (August and Sept. 1877). In his futile endeavours to take Fort Nicholas at the summit of the pass from the Russians, Suleiman Pasha lost 20,000 of his best men.

Shipley, a town of England, in the West Riding of Yorkshire, on the Aire, 3 miles N.W. of Bradford, giving name to a parliamentary division of the county. The inhabitants find employment in the worsted manufacture, and in quarries, &c. Pop. (including Saltaire) 23,387.

Ship-money, an impost levied at various times in England, especially on the seaports, for the purpose of furnishing ships for the king's service. Having lain dormant for many years, it was revived by Charles I., who in 1634 levied it on the coast towns, and in 1635 issued writs for ship-money all over the kingdom. The tax met with strong opposition, and the refusal of John Hampden to pay the twenty shillings at which he was rated was one of the proximate causes of the civil war.

Ship of Fools. See *Brandt.*

Ship-owners, LAW REGARDING, with respect to unseaworthy ships. By British law any person sending an unseaworthy ship to sea is guilty of a misdemeanour unless he can prove that he made use of all reasonable means to ensure that the ship should be seaworthy. Acts have been passed at various times giving the board of trade full authority to stop outgoing unseaworthy ships, and making it obligatory for a vessel before starting for a voyage to have the load-line distinctly marked.

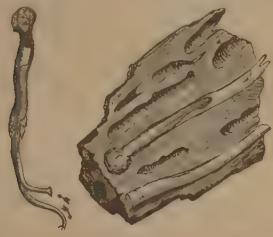
Ship Railway, a railway composed of several tracks, with some sort of carriage for transporting vessels from one body of water to another. Captain J. B. Eads's proposed plan for the Tehuantepec Ship Railway across the isthmus between North and South America in Mexican territory, consists essentially of a series of some eight or ten tracks, having a carrying car or cradle of some five sections, with altogether 1000 wheels. Calculated for a vessel of 10,000 tons, this would not give a pressure so great as that of an ordinary locomotive. A ship railway is in course of construction by the Canadian government between Chignecto Bay, in the Bay of Fundy, across the isthmus to Northumberland Straits, a distance of 17 miles. This will enable vessels to go from Prince Edward Island to St. John, New Brunswick, in twelve hours, and will greatly facilitate the transport of grain in bulk from the lake ports to New Brunswick. The vessels will be raised by hydraulic pressure a height of 40 feet to the level of the railway, and placed on a double track 18 feet from centre to centre. The flexible car system of ship railway invented by William Smith, harbour engineer of Aberdeen, is designed to allow of the use of ordinary railway gradients. The car is in sections, each carried on a compound bogie running on parallel lines. Vertical and lateral flexibility are secured, and the ship is sustained on the car by water-cushions, so that it is virtually kept floating. The ship is raised on to the cars by means of a submerged shipway inclosed within a wet dock.

Ships, REGISTRATION OF. No vessel is entitled to the privileges of a British ship unless registered by the collector and comptroller of the customs, and unregistered ships exercising the privileges of registered ones are to be forfeited; and no ship can be registered as a British ship which is not owned by a natural born or naturalized British subject, or by a body corporate having its principal place of business in the United Kingdom or some British possession. The registration comprises the name of the ship and the names and descriptions of the owners. For this purpose the property in a ship is always divided into sixty-four shares, and no one can be registered as owner of any fractional part of a share. The port of registry is considered that to which the ship belongs, and local registrars transmit their returns to the registrar-general of shipping and seamen.

Ship's Husband, an agent appointed by the owner or owners of a vessel to see to her

repairs, provisions, stores, manning, papers, &c., and in general to see her properly and efficiently equipped preparatory to a voyage.

Ship-worm (*Terēdo navālis*), the popular name of a lamellibranchiate mollusc belonging to the Pholadidæ or pholas family, and distinguished by the elongation of the respiratory 'siphons' or breathing-tubes conveying water to the gills, which give to this mollusc a somewhat vermiform or worm-like aspect. The two valves or halves of



Ship-worm (*Terēdo navālis*), and piece of wood perforated by Teredos.

the shell are of small size and globular shape, and are situated at its anterior extremity, the valves being three-lobed. In length the ship-worm averages about a foot, and in thickness about ½ inch. It has gained great notoriety from its boring habits, occasioning great destruction to ships and submerged wood by perforating them in all directions in order to establish a habitation. In boring into the wood (the shell is the boring instrument) each individual is careful to avoid the tube formed by its neighbour, and often a very thin film alone of wood is left between the cavities, which are lined with a calcareous incrustation. Various plans are tried to protect ships, piers, &c., from this destructive animal, such as copper-sheathing, treating with creasote, &c.; but the plan which appears to have been most successful in arresting its ravages is that of driving a number of short nails with large heads into the exposed timber. The rust from the heads of the nails appears to prevent its operation. A large species of teredo (*T. gigantea*) occurs in warm latitudes, where it bores into the hardened mud or sand of the sea-bed, as well as into timber.

Shiraz', a celebrated city of Persia, capital of the province of Fars, 165 miles N.E. of Bushire. It is situated at an elevation of 4500 feet above the level of the sea, in a large and fertile plain covered with rose-gardens, vineyards, cypress groves, and orchards. Founded about the beginning of the 8th century, it was long one of the most splendid cities of Persia, the residence of the ruler, the seat of science and art, celebrated for its magnificent buildings, its delicious climate, its elegant manufactures, and its extensive trade. It lost much of its importance after being conquered by Timur in the end of the 14th century, and it was almost entirely destroyed by an earthquake in 1812, and again in 1853. At present it is known chiefly for its wines and its inlaid work. Near the city are the tombs of Sadi and Hafiz, the poets. Pop. 32,000.

Shire (from Anglo-Saxon *sciran*, to divide), the name applied to the larger divisions into which Great Britain is divided, and practically corresponding to the term county, by which it is in many cases superseded. In some cases the shires are identical with the old Saxon states; such are Kent, Sussex, Essex, Middlesex, Surrey, Norfolk, and Suffolk. Other kingdoms were for convenience divided into several shires, and some shires which once had a separate existence have been merged into others. The head of the shire was originally the ealdorman (earl); the duties of the ealdorman, however, ultimately devolved upon the shire-reeve (sheriff). Scotland followed the example of England as regards the division of the country into shires, and twenty-five shires are enumerated in a public ordinance of 1305. In Scotland Kirkcudbright is neither a county nor a shire, but a stewartry (see *Stewartry*), and in England there were at one time three counties palatine. (See *County Palatine.*) The shires in England were subdivided into *hundreds, sokes, lathes*, &c., and these again into *tithings;* in Scotland they were subdivided into *wards* and *quarters.* (See *County.*)—*The Shires* is a term loosely applied to a belt of English counties running in a north-east direction from Devonshire and Hampshire, but often used for the midland counties generally.

Shiré (shē'rā), a river of South-eastern Africa, draining Lake Nyassa into the Zambesi, which it enters on its left bank, after a course of about 270 miles nearly due south. It is navigable throughout its entire length, with the exception of about 35 miles of falls and rapids, during the course of which it descends 1200 feet. See *Nyassa.*

Shirley, a town of Hampshire, 2 miles N.W. of Southampton, of which it is practically

a suburb. It is within the parliamentary limits of Southampton. Pop. 15,899.

Shirley, JAMES, dramatist, was born in London in 1596, and was educated at Merchant Taylors' School, St. John's College, Oxford, and Catherine Hall, Cambridge. He took holy orders, but soon after went over to the Church of Rome, and for some time made a living as a schoolmaster. Then he became a playwright, and had written more than thirty regular plays, tragedies, and comedies before 1642, when parliament suppressed theatres. After the Restoration some of his comedies were revived, but he did not again attempt to write for the stage. He died October 29, 1666, of, it is said, fright caused by the great fire. Shirley was the last of the great writers who belong to the school of Shakspere, and his dramas, though they do not display much inventive power, are yet poetical, and the dialogues full of animation. His best tragedy is perhaps The Traitor, and his best comedy The Lady of Pleasure, both produced in 1635; but Shirley himself preferred The Cardinal (1641), an attempt to compete with Webster's Duchess of Malfi. He was the author also of three small volumes of poems and masques.

Shirwa, or TAMANDUA, a lake of south-east Africa, lying on the left side of the Shiré, to the south-east of Lake Nyassa. It is a secluded basin, lying at an elevation of 2000 feet above the sea, and surrounded by mountains which reach a height of 7000 to 8000 feet. It is mostly shallow, and infested by hippopotami and crocodiles.

Shisdra, a town of Russia, government of Kaluga, 80 miles south-west of Kaluga; has manufactures of woollen cloth, glass, and leather. Pop. 10,572.

Shi'shak, an Egyptian king, mentioned by the Hebrew writers, the Sheshenk I. of the monuments, and the first sovereign of the Bubastite twenty-second dynasty, established about 961 B.C. It was he to whom Jeroboam fled for protection when he fell under the suspicion of Solomon; and in the fifth year of Rehoboam he invaded Judah, and returned with the treasures of the temple and the palace. A remarkable sculpture at the temple of Karnak gives a list of 130 names of towns and peoples, including towns both of Judah and of Israel, conquered in this expedition by Shishak, who appears to have been one of the ablest and most powerful of the Egyptian monarchs. His reign lasted at least twenty-one years.

Shittim-wood, of which the tabernacle in the wilderness was principally constructed, was the wood of the shittah-tree of the Bible, which is supposed to be the *Acacia seyal* of the Sinaitic peninsula. (See *Acacia*.) It is a light but cross-grained and enduring wood, of a fine orange-brown colour.

Shoa, a province in the south-east of Abyssinia, often holding the position of a semi-independent kingdom; area, 26,000 sq. miles. It consists (like the rest of Abyssinia) mostly of plateaus reaching up to an elevation of 10,000 feet on the south-east and south, overtopped by higher mountains, and intersected by numerous streams mostly tributaries of the Blue Nile. The capital is Ankober. In 1889 Menelek, king of Shoa, became ruler of all Abyssinia, which position he still retains.

Shock, in medicine, a sudden vital depression of the system produced by violent injuries or violent mental emotions. It is especially a surgical term. The vital phenomena of the body—consciousness, respiration, heart-action, capillary circulation—are depressed in proportion to the shock received by the nerve-centres. In the state of collapse consequent upon a shock the patient lies completely prostrate, the face pale and bloodless, the skin cold and clammy, and the features contracted and expressive of great languor. There is also extreme muscular debility, and the pulse is frequently so weak as scarcely to be perceptible. Incoherency, drowsiness, or complete insensibility, is often manifested on the part of the patient. Shock results either in a complete suspension of the action of heart, causing death, or passes into reaction; and the treatment of shock is to be directed to the immediate development of reaction. In mild cases external warmth, a little stimulant, and rest are all that is required; but in the severer forms a more liberal recourse to heat and stimulants is absolutely necessary, and should be continued until indications of commencing reaction appear. The heat should be applied to the pit of the stomach and the extremities by means of hot flannel, hot-water tins, or like appliances. The stimulant most recommended is brandy in hot water, and this should be followed by nourishment, such as beef-tea.

Shoddy, the fibrous substance composed of woollen rags torn fine in a machine called a 'devil,' and converted into cheap cloth by being mixed and spun with a certain proportion of fresh wool. The towns of Batley,

Dewsbury, and Heckmondwike, in the West Riding of Yorkshire, are the chief seats of the shoddy trade.

Shoeburyness, a village of Essex, on the estuary of the Thames, opposite Sheerness, and 45 miles E. of London. A school of gunnery is maintained here for the purpose of giving practical instruction in gunnery to officers and men of the artillery, and carrying on all experiments in artillery and stores. At Shoeburyness all new inventions in armour, whether for fortifications or for iron-clads, are tested, and all new guns are tried.

Shoes, coverings for the feet, generally made of leather in Europe and America, but in Holland and France often of wood, and in China and Japan of paper and other fabrics. The shoe is a combination of the sandal of the oriental races and the moccasin of untanned hide of savage races—sole without upper and upper without sole. The first allusion to a shoe in the Old Testament is where Abraham refuses to take so much as a 'shoe-latchet' from the King of Sodom. For 'shoe' in this instance we are probably to understand 'sandal;' but shoes proper, as well as sandals, seem to have been used amongst the Jews; for on the black obelisk from Nimroud Jews are represented as wearing shoes or boots with turned-up toes, similar to those worn by orientals in the present day. The Romans used various kinds of shoes, such as the *solea* or sandal; the *calceus*, which covered the whole foot, somewhat like our shoes, and was tied with a latchet or lace; and the *caliga*, a very strong kind of shoe, sometimes shod with nails, worn by the soldiers, who were thence called *caligati*. Both in ancient and in modern times the fashion of shoes has varied much, just as in other articles of dress. In the reigns of Henry I. and Stephen, shoes were made for the fashionables with long points stuffed with tow, and made to curl in the form of a ram's horn; and in the reign of Richard II. the points had increased to such an extent that they reached the knee, to which they were secured by chains of silver or gold. In the 18th century, among the ladies, absurdly high-heeled shoes were the rage, a fashion which has been revived within the last few years. The present simple form of shoe was adopted in the early part of the 17th century, and somewhat later the shoe buckle came into use. In the early part of the 19th century buckles appear to have become unfashionable, their place being supplied by the simpler and less costly shoe-strings. To the same period belongs another improvement, that of making shoes right and left. Boots are a variety of shoe with the upper leathers lengthened so as to protect part of the leg. Till recently the making of boots and shoes was a purely manual handicraft; now, with the exception of the finest and best finished qualities, the manufacture is done almost entirely by machinery.

Shogun. See *Shiogun*.

Sholapur', chief town of Sholapur District, Bombay Presidency, India, 150 miles by rail from Poona. Its situation between Poona and Haiderabad has made it, especially since the opening of the railway in 1859, the centre for the trade of a large extent of country. Its chief industry is the manufacture of silk and cotton cloth. Sholapur was stormed by General Munro in 1818, when the whole of the Peshwa's territories were incorporated in the Bombay Presidency. Pop. (including cantonment), 61,281.—The district of Sholapur has an area of 4521 sq. miles, and pop. 750,689.

Shooting-star, a meteor in a state of incandescence, caused by the resistance of the atmosphere, seen suddenly darting along some part of the sky. See *Aerolite* and *Meteor*.

Shore, JANE, the wife of a rich goldsmith of London in the 15th century, and mistress of Edward IV. After the death of Edward, in 1483, she seems to have been the paramour of Lord Hastings, whom Richard III., then Duke of Gloucester, and protector, suddenly ordered to be beheaded, June 13, 1483. Richard had accused Hastings of conspiring against him along with Jane Shore. The charge could not, however, be substantiated, and he directed her to be tried for lewdness by the spiritual court, and she was obliged to do public penance at St. Paul's. She found a new protector in the Marquis of Dorset, after whose banishment she seems to have married one Lynom, the king's solicitor. She is supposed to have died at an advanced age in the reign of Henry VIII.

Sho'rea, a small genus of Indian plants, natural order Dipteraceæ. One species (*S. robusta*) yields the timber called in India *sal* or *saul*. See *Sâl*.

Shoreditch, a parish and parliamentary borough of Middlesex, in the east of London. It was made a parliamentary borough in 1885, with two divisions—Hoxton and

Haggerstone—one member for each division. Area, 648 acres; pop. 124,009.

Shoreham, or NEW SHOREHAM, a seaport town of England, in the county of Sussex, 6 miles west of Brighton, at the mouth of the Adur, here crossed by a suspension-bridge. It was formerly a parliamentary borough returning (from the time of Edward III.) two members, but in 1885 it was deprived of separate representation, the extensive area which the borough comprised being merged in the county. It has a fine old parish church, which dates from about 1100. The harbour is encumbered by a bar, but carries on considerable trade. Pop. 3393. —OLD SHOREHAM was situated a mile N.W. of the modern town, and its harbour was long a great outlet to the Continent, but in the 15th century it got silted up.

Shore-hopper (*Orchestia littorea*), a genus of crustaceans of the order Amphipoda, having the first pair of legs of smaller size than the second pair. By this, and by its more compressed body, it may be distinguished from the familiar sand-hopper, in company with which it is often met with on sandy coasts.

Shorthand, the method of writing by which the process is so abbreviated as to keep pace with speech. It is also known, according to the principle underlying the particular system, as tachygraphy (quick writing), brachygraphy (short writing), stenography (compressed writing), and phonography (sound writing). It was practised by the ancient Greeks and Romans, not only on account of its brevity but for purposes of secrecy; but all knowledge of the art was lost from the 10th century until the end of the 16th, when modern shorthand had its birth in the publication by Dr. Timothy Bright of his Characterie (1587), and by Peter Bales of his Arte of Brachygraphie (1590). In these early systems arbitrary signs were used in most cases to denote each word. The earliest system of shorthand of any practical importance was that of John Willis, whose Arte of Stenographie (1602) became very popular. It was based on the common alphabet, with the addition of arbitrary signs; and this, indeed, was the character of the numerous systems which obtained until the time of Pitman. Among Willis's imitators were T. Shelton, whose system (1620) was used by Samuel Pepys, and that of Jeremiah Rich, whose system (1646) was commended by Locke. Rich's system was improved by William Mason (1672), the best shorthand writer of the 17th century; and Thomas Gurney published his Brachygraphy, founded on Mason's system, in 1753. The use of Gurney's system has been perpetuated by his descendants, who have been the official shorthand writers of the houses of parliament since the beginning of the century. In 1767 appeared the Universal English Shorthand of John Byrom, an a, b, c system characterized by 'simple strokes and no arbitrary characters'; and in 1780 was published an improvement of Byrom's system by William Mason. Samuel Taylor published his Stenography in 1786. This, which is the best of all the a, b, c systems, contributed largely to make stenography popular, and it was the system which was almost universally used until Isaac Pitman gave his Phonography to the world in 1837. In comparison with Gurney's system, Taylor's system possesses more easy and natural outlines, and is therefore capable of being written with a greater degree of speed. Like Byrom, Taylor discarded arbitrary characters altogether; but Harding, who re-edited his system in 1823, introduced a few.

Pitman had a number of predecessors, whose systems, like his own, were strictly phonetic. These systems, however, never obtained any footing, while Pitman's almost immediately became popular, and is now used by a larger number of reporters and shorthand writers, both in Great Britain and in America, than any other. Taylor's system ranks next in point of use, and Gurney's third. Like all other phonetic systems, Pitman's rejects the ordinary orthography, and writes words according to their sounds; thus, *though* becomes *tho*, *plough* becomes *plow*, and *enough* becomes *enuf*. Discarding the common alphabet, which formed the basis of the stenographic systems, it has adopted an alphabet of its own, consisting of a series of straight lines, curves, dots, &c., each representing a distinct sound. This alphabet is the basis of a highly ingenious and complex system, which aims at securing the greatest degree of brevity consistent with legibility. This end it endeavours to attain by a variety of devices, forming integral parts of the system. In rapid writing on Pitman's system the vowels are generally omitted.

Of several other systems which have recently been given to the public among the best known are Professor J. D. Everett's Shorthand for General Use (1877), Edward Pocknell's Legible Shorthand (1881), and J. M. Sloan's adaptation of the French system

of Duployé (1882). The chief feature of the system of Professor Everett, who claims to have adhered to the phonetic principle more strictly than Pitman, is that, by a variety of devices, all vowels are indicated. In Pocknell's system there is a tendency to return to the earlier alphabetic style, with a greater use of arbitrary signs. In the Sloan-Duployan system the characters do not strictly indicate certain sounds, nor are they all written in the order in which they are meant to be read. A further distinction of this method is, that it introduces three slopes between the perpendicular and the horizontal. This question of slope is of great importance, and it is claimed as the merit of the Bavarian stenographer Gabelsberger that he recognized that geometrical characters should be discarded in favour of the elementary lines of current writing. An attempt to deal with this question of slope, and with the other equally important question of the vowels, was made in Script Shorthand (1886), which is said to have already yielded valuable results. This system is founded on the phonetic principle, and is characterized by one (the longhand) slope and by joined vowels. The Oxford Shorthand (1888) is perhaps the most recent system of abbreviated writing. It has been introduced into various schools, and seems to be making good progress in public estimation. The merits claimed for this system are, that it is written on one slope as in longhand. Consequently, while there is by this method a gain in speed and legibility, the longhand of the learner is not spoiled by its practice. The alphabetic signs, also, are few and simple; the vowels and consonants are joined and written in their natural order, and the various 'positions' of the alphabetical outlines in other systems are here abolished.

England was the birthplace of modern shorthand, and continental nations derived their first knowledge of the art either directly or indirectly from England. In France the system used by the majority of professional shorthand writers is that of Prévost, which is a modification of Taylor's system. In Germany the most important system is that of Gabelsberger (1829), on which is based the system of W. Stolze (1840). Gabelsberger's system is founded on modifications of geometrical signs, so adjusted as to facilitate rapid writing as in ordinary longhand, while the vowels are indicated by the shape or position of the consonants. It has been adapted to English by H. Richter (1886), and to most of the languages of Europe. In America the leading system is Pitman's, which, introduced in 1845, has made great progress since 1880, and is now taught in a large number of schools.

Shorthorns, a breed of cattle externally distinguished by the shortness of their horns, which originated in the beginning of this century in the valley of the Tees, and under the name of Durhams, Teeswaters, or Shorthorns, soon spread over all the richly pastured districts of Britain. They are excellent for grazing purposes, being of rapid and large growth with aptness to fatten, but are inferior to some other breeds for dairy purposes.

Shorthouse, JOHN HENRY, novelist, a native of Birmingham, was born in 1834, and was educated privately. His reputation rests upon one book, John Inglesant (1881), a romance of the Stuart period, which excited a great amount of interest on its appearance. Among his later works is Sir Percival, a Story of the Past and Present (1886), and Blanche, Lady Falaise (1891).

Short-sightedness. See *Sight*.

Shoshone Falls (sho-shō′nē), on Lewis or Snake River, in the state of Idaho, United States. They rank amongst the waterfalls of North America next to those of Niagara in grandeur, being about 300 yards wide and 200 feet high.

Shoshones (sho-shō′nēz), or SNAKES, a tribe of North American Indians inhabiting a considerable stretch of territory in Idaho, Utah, Nevada, &c. They live partly by hunting and fishing, many of them also on roots and small animals. They number about 5000.

Shoshong′, a town in the British protectorate of Bechuanaland, South Africa, about 400 miles N. of Kimberley. It was at one time the capital of Khama, chief of the Bamangwato tribe of Bechuanas, but after Bechuanaland became a British protectorate it was abandoned in favour of Palapye (or Palachwe), a place about 60 miles to the north-east of it, and now the Bamangwato capital. Both Shoshong and Palapye are on the route by road and railway leading from Cape Town and Kimberley to Buluwayo. Palapye is situated in a fertile district, and in its centre is a large square through which a stream runs.

Shot, a term applied to all solid projectiles fired from cannon, and also to hollow projectiles without bursting charges, as the Palliser shot. Solid shot have gradually

disappeared since the introduction of rifled guns, which fire elongated shot with more or less conical heads. Some of the shot fired by the immense guns now used weigh not far short of a ton. Smooth-bored ordnance still use solid round shot and case-shot. Case-shot consists of iron balls packed in iron or tin cylindrical cases. Grape differs only in the balls being larger. (See *Shell*, *Cannon*, &c.) Shot is also the name given to the small round pellets of lead used with sporting guns for shooting small quadrupeds and birds. This kind of shot is made by dropping the melted lead through the holes of a colander set at a considerable height above water, the drops naturally assuming the globular form.

Shotts, a large parish of Scotland, in Lanarkshire, containing the villages of Harthill, Calderhead, Shotts Ironworks, &c., about 16 miles S.E. of Glasgow; area, 24,944 acres; pop. 11,214. Coal and ironstone abound, and are largely worked. The Shotts iron-works are world-famous.

Shoulder-joint, the articulation of the upper arm or humerus with the glenoid cavity of the scapula or shoulder-blade. (See *Arm*.) The shoulder-joint forms an example of the ball-and-socket joints, the ball-like or rounded head of the humerus working in the shallow cup of the glenoid cavity. Such a form of joint necessarily allows of very considerable movement, while the joint itself is guarded against dislocation or displacement by the strong ligaments surrounding it, as well as by the tendons of its investing and other muscles. The muscles which are related to the shoulder-joint are the *supraspinatus* above, the long head of the *triceps* below, the *subscapularis* internally, the *infraspinatus* and *teres minor* externally, and the long tendon of the *biceps* within. The *deltoid* muscle lies on the external aspect of the joint, and covers it on its outer side in front, and behind as well, being the most important of the muscles connected with it. The movements of the shoulder-joint consist in those of abduction, adduction, circumduction, and rotation—a 'universal' movement being thus permitted; and its free motion is further aided, when the bony surfaces are in contact, by separate movements of the scapula itself, and by the motions of the articulations between the sternum and clavicle, and between the coracoid process and clavicle also. The biceps muscle, from its connection with both elbow and shoulder joints, brings the movements of both into harmonious relation. The shoulder-joint is liable to various diseases and injuries. Local injury may result in inflammation of the joint, whilst special diatheses or diseased conditions of constitutional origin may each give rise, either *per se* or through injuries, to such lesions as strumous or scrofulous disease of the joint, to syphilitic lesions, and to gouty or rheumatic attacks. Of the accidents to which the joint is liable *dislocations* are by far the most frequent.

Shovel, SIR CLOUDESLEY, British admiral, born of poor parents in 1650, entered the navy as a cabin-boy, but soon rose by his talents, commanded the *Edgar* at the first fight of Bantry Bay, and shortly afterwards was knighted. He distinguished himself at Beechey Head (1690), La Hogue (1692), and Malaga (1704), and in 1705 was named rear-admiral of England, and succeeded Sir George Rooke as commander-in-chief of the British fleets. He took part in the capture of Barcelona (1705), and in the unsuccessful attempt upon Toulon (1707). When returning home with the fleet (October 22, 1707) he was wrecked on the rocks near Scilly, and of the 800 men on board his ship, *The Association*, not a soul was saved. His body was washed on shore next day, and buried in Westminster Abbey.

Shovel-fish (*Scaphiorhynchus cataphractes*), a genus of ganoid fishes belonging to the Sturionidæ or sturgeon family, and found in North American rivers. It is so named from the flattened form of the head.

Shoveller-duck (*Spatŭla clypeāta*), a genus of Anatidæ or ducks, distinguished by its long bill, of which the tip is hooked and broadened. The average length of this bird is about 18 or 20 inches. In the male the colours are rather gay and varied—green, white, brown, pale blue, and black. The colouring of the female is more sombre. The shoveller-duck is found in Britain during the winter months.

Showbread, in the Bible, the twelve loaves of bread, representing the twelve tribes of Israel, which were exhibited before the Lord on the golden table in the sanctuary. They were made of fine flour unleavened, were changed every Sabbath, and were eaten by the priests only.

Showers of Fishes have occurred in Britain, but are most frequent in tropical regions. These showers usually take place near large bodies of water, and the fishes must have been caught up by a whirlwind

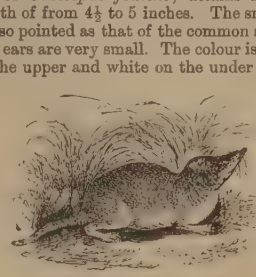
or similar commotion along with the water they inhabit. Writers of repute, both ancient and modern, state that frogs and toads also sometimes fall from the clouds in the same way.

Shrapnel, Lieutenant-general Henry, entered the Royal Artillery in 1779, served with the Duke of York's army in Flanders, and shortly after the siege of Dunkirk invented the case-shot known by the name of shrapnel-shells, an invention for which he received from government a pension of £1200 a year in addition to his pay in the army. He retired from active service in 1825, attained the rank of lieutenant-general in 1827, and died in 1842.

Shrapnel-shell. See *Shell.*

Shreveport, a city of the United States, in the state of Louisiana, on the Red River, 327 miles by rail N.W. of New Orleans, with which it has regular steamboat communication. It is situated in a splendid cotton-growing region, and is one of the principal cotton-markets in the south-west of the United States. Its industries are varied. Pop. 11,979.

Shrew, or Shrew-mouse, a genus of mammals belonging to the order Insectivora, and to be carefully distinguished from the ordinary and common mice (Muridæ), which are included in the order Rodentia; and from the dormice (Myoxidæ), also belonging to the Rodent order. The shrews form the family Soricidæ, and the genus *Sorex* includes the typical members, three of which are found in Britain, namely, the common shrew, the lesser shrew, and the water shrew, and extend eastwards through Europe and Asia north of the Himalayas. The common shrew (*S. araneus* or *vulgāris*) averages about 4 inches in length, the square tail making up half of this measurement. It may readily be distinguished by its prolonged muzzle, by the teeth being coloured brown at the tips, and by the reddish-brown fur. It feeds upon insects and their larvæ, and inhabits dry places, making a nest of leaves and grasses. Its habits are chiefly nocturnal. Shrews are very voracious in their habits, and frequently kill and devour one another. They secrete a fluid of disagreeable odour in special glands, and this odour prevents larger animals from eating their flesh. In former days the bite of the shrew was accounted venomous, whilst its body, variously treated, was regarded as a cure for many complaints. The lesser shrew (*S. pygmæus*) is rare in England and Scotland, but is comparatively common in Ireland, where the common shrew is not found. It closely resembles the common shrew in external form, differing from it chiefly in point of size. The water shrew (*S.* or *Crossopus fodiens*) attains a total length of from 4½ to 5 inches. The snout is not so pointed as that of the common shrew. The ears are very small. The colour is black on the upper and white on the under parts.



Common Shrew (*Sorex araneus*).

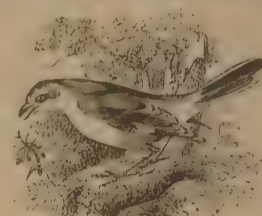
A prominent swimming fringe of stiff white hairs is found on the tail and on the toes, and forms a distinctive feature of the species. Its food resembles that of the common shrew, but aquatic larvæ appear to form a large part of its nutriment. It makes its burrows in the overhanging banks of rivers and lakes, and dives and swims with great facility. It is not found in Ireland, and is rare in Scotland, but is generally distributed throughout England. The red-toothed shrews characteristic of the North American continent belong to the allied genus *Blarina*, distinguished from *Sorex* by the dentition and the remarkable shortness of the tail; but there are also a number of North American shrews belonging to the genus *Sorex*.

Shrew-mole (*Scalops aquaticus*), a genus of insectivorous mammals, belonging to the family of Soricidæ or shrew-mice, but also by some zoologists placed in the Talpidæ or mole family. It is found in North America, usually near rivers and streams, and burrows after the fashion of the common mole, like which, also, its fur is fine and closely set. The average length is about 7 inches.

Shrewsbury, a municipal and parliamentary borough of England, capital of Shropshire, situated on a slightly elevated peninsula formed by a bend of the Severn, 42 miles N.W. of Birmingham. It consists of some handsome modern houses and many old timbered houses of very picturesque appearance. Three bridges cross the Severn and connect the town with its suburbs.

Among objects deserving of notice are the remains of the old walls; the ruins of the castle; the Church of Holy Cross, originally attached to a magnificent Benedictine abbey, founded in 1083; the grammar-school, ranking high among public schools, founded by Edward VI. in 1551, and removed to new buildings at Kingsland in 1882; the market-house, of the time of Queen Elizabeth; statues of Lords Clive and Hill, &c. The chief manufactures are glass-staining, the spinning of flax and linen yarn, iron-founding, brewing, the preparation of brawn, and the making of the well-known 'Shrewsbury cakes.' In 1403 the famous battle which issued in the defeat of Hotspur and the Earl of Douglas his ally by Henry IV. was fought in the vicinity. Shrewsbury returns one member to parliament; it returned two members from the reign of Edward I. until 1885. Pop. 26,967.

Shrike, a general name applied to the members of a family (Laniidæ) of insessorial birds belonging to the dentirostal division of the order. The family is conveniently divided into two groups, the Laniinæ, or true shrikes, and the Thamnophilinæ, or bush-shrikes. The genus *Lanius* is distinguished by the broad base of the bill, which is hooked at the tip. The nostrils, which are situated laterally, are surrounded by bristles. The fourth quill is longest in the wings, and the tail is of graduated or conical shape. The great gray shrike (*L. excubitor*) makes its appearance in Britain during the winter. This species is coloured gray on the upper and white on the under parts; the quills of the tail being black with white tips, whilst a band of black crosses the forehead, surrounds the eyes, and terminates at the ear covers. The average length is about 9 or 10 inches. The food consists of mice, shrew-mice, small birds, frogs, and insects; and these birds have the habit of impaling their prey on thorns or suspending it on the branches of trees, in order to tear it to pieces with greater ease, a habit which has obtained for them the name of butcher-birds. The red-backed shrike (*Lanius* or *Enneoctŏnus collurio*) is a common summer visitant to Britain. Its average length is 6 or 7 inches. A popular name for it (and also for other species) is the nine-killer, from a belief that it impales nine creatures together before beginning to eat them. The woodchat shrike (*L.* or *E. rufus*) sometimes appears in Britain. In the Thamnophilinæ, or tree shrikes, the bill is long and possesses an arched keel, the tip being hooked and bristles existing at the base. Some of the species attain a length of from 12 to 13 inches. They are common in South America.



Great Gray Shrike (*Lanius excubitor*).

The name of drongos or drongo-shrikes has been given to certain birds allied to the shrikes, and forming the family Dicrurinæ. The forked-tailed crested shrike, a bird inhabiting India, about 10 inches in length, is an example of these.

Shrimp, the name applied to many small crustaceans, and especially to the *Crangon vulgāris* or common shrimp, which belongs to the order Decapoda (ten-footed crustacea) and to the sub order Macroura (long tailed). The common shrimp reaches a size of about 2½ inches, inhabits the sand of many parts of the British and Irish coasts, and is caught for the market by means of a bag-net placed transversely on a pole, which is pushed through the sand at a depth of about 1½ or 2 feet. When alive it is of a light-brown or almost white colour, resembling that of the sand in which it lives, but after boiling it assumes the well-known brown colour. It is common on the east and west coasts of North America as well as those of Britain. Other British species are the banded shrimp (*C. fasciātus*), Bell's shrimp (*C. sculptus*), scarlet shrimp (*Alphēus ruber*). The *Pandālus annulicornis*, or red shrimp, inhabits deeper water than the common shrimp, and is not nearly so abundant. It is taken for the market chiefly on the east and south coasts of England, but occurs also in Scotland and Ireland. It reaches a size of from 2 to 2½ inches. When alive it is of a reddish-gray, with spots of deeper red; after boiling it is of a uniform deep red. This species is sometimes confounded with the common prawn; but it never reaches the size of the prawn, which, when adult, is above 4 inches in length.

Belonging to the crustacean order Amphipods, and allied to the sand-hoppers, we find the so-called 'fresh-water shrimp' (*Gammărus pulex*) of streams and brooks, distinguished as a genus by the slender upper antennæ, by the tufts of spines on the tail, and by the first and second pairs of legs possessing small nippers. The name 'shrimp' has been applied to this form from its rough resemblance to the familiar marine shrimps. Other crustaceans are called brine-shrimps, opossum-shrimps, &c.

Shrine, originally a reliquary, or some kind of receptacle, for holding the bones or other relics of saints. Sometimes shrines were merely small boxes with raised tops like roofs; sometimes actual models of churches;

Portable Shrine, Malmesbury Abbey.

sometimes the tombs or mausoleums of saints—large constructions, like that of Edward the Confessor at Westminster. Many were (and are) ornamented with gold, precious stones, or inlaid work; and among R. Catholics some shrines are still objects of pilgrimage.

Shropshire, or Salop, an inland county of England, bounded by Cheshire, the detached part of Flintshire, Denbighshire, Montgomeryshire, Radnorshire, Herefordshire, Worcestershire, and Staffordshire. Area, 841,167 acres, of which about seven-eighths are under crop. The county is divided into two nearly equal portions by the Severn, running south-east; the northern is generally level; the southern is more hilly, reaching in the Clee Hills a height of 1805 feet. The principal mineral products are iron, coal, lead, limestone, and freestone. The coal-fields are extensive and productive. The soil is various, but generally fertile and well cultivated, although there are extensive tracts of waste land. The principal crops are wheat, barley, oats, peas, vetches, turnips, potatoes, and beans. In the south and west cattle-breeding and dairy-farming are carried on. The county is famous for its breed of sheep. A good deal of cheese is made, and large flocks of turkeys are raised. The manufactures include that of iron to a very great extent, chinaware, carpets, gloves, and flannel. Shropshire is divided into four parliamentary districts—Western or Oswestry, Northern or Newport, Mid or Wellington, and Southern or Ludlow; the only parliamentary borough is now Shrewsbury, Bridgenorth, Ludlow, and Wenlock having been thrown for parliamentary purposes into the county in 1885. Pop. 236,324.

Shrouds, a range of large ropes extended from the heads of the lower masts to both sides of a ship to support the masts, and named, from the masts to which they belong, the main, fore, and mizzen shrouds. Topmast, topgallant, and bowsprit shrouds are all similar in their object.

Shrove-Tuesday, the day before the first day of Lent or Ash-Wednesday, so called as a day on which confession was specially made and 'shrift' received. (See *Carnival* and *Lent*.) It was a day of considerable festivity, and from the common practice of eating pancakes then the day came to be called *Pancake Tuesday*.

Shrub, a liqueur, consisting of lime or lemon juice and syrup, with the addition of rum or other spirit. It is made chiefly in the West Indies.

Shrubs, plants in which the perennial portion forms the greater part, which branch near the base, which are taller than bushes but not so tall as trees, seldom exceeding the height of a man. For practical purposes shrubs are divided into the deciduous and evergreen kinds. Among ornamental shrubs the best known are those belonging to the genera *Rosa*, *Ribes*, *Rhododendron*, *Azalea*, &c. Among evergreen shrubs are the box, the laurel, and various heaths.

Shujabad', a town in Multan District, Punjab, India, about 5 miles from the present left bank of the Chenab, the trade centre for the richest portion of the district. Pop. 6468.

Shumla, a fortified town of Bulgaria, 50 miles west of Varna. Inclosed on the north and west by hills which form a natural rampart, strongly fortified, and with roads leading northward to Rustchuk and Silistria, southward to the passes of the Balkans, and eastward to Varna, Shumla is one of the most important military positions in the Balkan Peninsula. Pop. 23,161.

Shusha, a town of Asiatic Russia, in

Transcaucasia, in the government of Elisabethpol, 230 miles south-east of Tiflis, on an isolated rocky eminence nearly 4000 feet high. Shusha was formerly a fortress, and the capital of the khanate of Karabagh, annexed to Russia in 1822. Pop. 24,552.

Shushan. See *Susa.*

Shuster, a town of Persia, in the province of Khuzistan, on the Karun, 170 miles west by south of Ispahan. Once a flourishing provincial capital of Persia, it is now rising into importance again owing to its position on the Karun. That river is well adapted for steam navigation from its mouth to the neighbourhood of this place, from which the land journey to Ispahan is 200 miles shorter than from Bushire. Pop. 27,000.

Shutar Gardan, a mountain pass in Afghanistan, connecting the Kuram and Logar valleys. The ascent from the Indian side is slight, but the descent into the Logar Valley is long and very steep. The pass commands the road to Kabul, and the possession of it in 1879 enabled General Roberts to advance on that city and occupy it almost without opposition.

Shuttle, the instrument used to carry the weft-thread in weaving. See *Loom.*

Shuya, a town of Russia, in the government of Vladimir, 68 miles N.E. of Vladimir, on the navigable Teza. It is one of the centres of the cotton industry of middle Russia. Pop. 19,560.

Sial'idæ, a group of neuropterous insects, with very large anterior wings, which frequent the neighbourhood of water. *Sialis lutaria* is a well-known member of this group, being used as a bait by anglers.

Sialkot. See *Sealkote.*

Sial'ogogues, in medicine, drugs which cause an increased secretion of saliva, as pyrethrum, the various preparations of mercury, cubebs, &c.

Siam', a kingdom embracing a great part of the Indo-Chinese Peninsula and part of the Malay Peninsula, and lying between Burmah on the west, and Anam and Cambodia on the east and south-east. Its chief natural boundaries are the Mekong and the sea. Its area is estimated at about 200,000 square miles, and its population at 6,000,000, including 2,000,000 Siamese, 2,000,000 Laotians, 1,000,000 Chinese, and 1,000,000 Malays. A large part of the territory is not well known. Siam proper consists mainly of the low-lying alluvial basin of the Menam and its numerous tributaries, which flows southward into the Gulf of Siam, forming an extensive and intricate delta, on which is situated Bangkok, the capital. This alluvial plain, intersected by numerous streams and canals, is extremely fertile, producing magnificent crops of rice, sugar, cotton, maize, and indigo. Both sides of the Menam basin are skirted by densely-wooded ranges of hills, forming the water-partings towards the Salwin and Mekong, the latter of which is the great river of Eastern Siam. The minerals include gold, tin, iron, copper, lead, zinc, and antimony, besides several precious stones, such as the sapphire, oriental ruby, and oriental topaz. Mining is chiefly in the hands of the Chinese. Much of Upper Siam seems incapable of being cultivated. During the dry season, which lasts from November to May, there is an utter absence of rain in this region, which again is so flooded by rain during the wet season as to be converted into a vast swampy forest. Cocoa and areca palms are numerous in Siam; fruits are abundant and of excellent quality; black pepper, tobacco, cardamoms, and gamboge are important products. The forests produce aloes-wood, sappan-wood, teak-timber, bamboos, rattans, gutta-percha, dammar, catechu, benzoin, &c. Among wild animals are the tiger, leopard, bear, otter, ourang-outang, single-horned rhinoceros, and elephant, which here attains a size and beauty elsewhere unknown. The last, when of a white colour, is held in the highest reverence. The forests abound with peacocks, pheasants, and pigeons; and in the islands are large flocks of the swallows that produce the famed edible birds'-nests. Crocodiles, geckoes, and other kinds of lizards, tortoises, and green-turtles are numerous. The python serpent attains an immense size, and there are many species of snakes.

Commerce.—Nearly the whole of the trade of Siam is in the hands of foreigners, and the foreign trade centres at Bangkok. The chief export is rice, after which come teak, pepper, dried fish, birds'-nests, cattle, and teel seed. The chief imports are gold-leaf and treasure, and cottons, after which come opium, china goods, gunny bags, hardware, kerosene-oil, and silk goods. In 1895 the exports from Bangkok were valued at £2,700,000, and the imports at £2,070,000. The trade is chiefly with Hong-Kong and Singapore, and (to a much less extent) with Lower Burmah, and Great Britain. The chief direct exports to Great Britain are teak-wood and rice; the chief direct imports from Great Britain are

machinery and mill-work, wrought and unwrought iron, cottons, hardware, and furniture; besides which large quantities of British piece-goods are transhipped at Singapore. Telegraph lines connect Bangkok with Tavoy in Lower Burmah, with Pnompenh in Cambodia, and with Chiengmai, the chief city of North Siam, and others are being constructed. There is a postal service at Bangkok, and in 1885 Siam joined the International Postal Union. A railway from Bangkok inland is being made.

People.—The Siamese are members of the great Mongolian family, and of the same race as the people of Burmah and Anam. In stature they do not average more than 5 feet 3 inches in height; they have a lighter-coloured skin than the western Asiatics, but darker than the Chinese. They are generally vain, indolent, superstitious, and cowardly, but polite, kind-hearted, and tolerant. Elementary education is general, most of the Siamese being able to read and write. Among the higher classes European manners and customs are gaining admission, including European dress. The houses are mostly constructed of timber and bamboo, and in localities subject to inundation are raised on piles. The Siamese profess Buddhism, introduced into the country about the middle of the 7th century. Christianity is now making some progress in the country. Some of the temples are large and elaborate structures richly decorated. The language forms a connecting link between the Chinese and Malay. The written characters seem to be derived from a form of Sanskrit. The literature is meagre, uninteresting, and in point of imagination and force of expression much below the Arabic, Persian, or Hindustani. The literary language has been much influenced by Pali and Sanskrit. The language of the chief Buddhist works is Pali. The printing-press has been introduced in recent years, and many of the best Siamese works can now be had in a printed form.

Government.—The legislative power is exercised by the king in conjunction with a council of ministers. The royal revenue, estimated at £2,000,000 a year, is raised by the land-tax, and by taxes on fruit-trees, spirits, opium, gambling, customs, tin-mines, edible birds'-nests, and fisheries. There is a small standing army, officered to some extent by Europeans, and a general armament of the people, in the form of a militia. The navy consists of 4 steam corvettes, mostly officered by Europeans, chiefly Englishmen. There are 41 provinces, each administered by a governor.

History.—Siam appears to have no place in history prior to A.D. 638, and the credible records go back only to 1350, the date of the foundation of Ayuthia, the old capital. The Portuguese established intercourse with Siam in 1511, but in the 17th century were gradually supplanted by the Dutch. English traders were in Siam very early in the 17th century, but in consequence of a massacre their factory at Ayuthia was abandoned in 1688. The French were expelled about the same time, and the trade was neglected until 1856, when Sir J. Bowring's treaty again opened up Siam to Europeans. Since that date western ideas of civilization have been introduced to some extent, and a few of the Siamese youth are now sent to Europe for their education. The present king is Chulalonkorn I., who was born in 1853, and succeeded his father in 1868. Like his father he has had an English education, and is an enlightened ruler. Recently a considerable portion of Siamese territory has been acquired by France.

Siamang (*Siamanga* or *Hylobates syndactylus*), one of the higher anthropoid or manlike apes. This animal, the largest and one of the best known of the gibbons, inhabits Sumatra. It averages about 3 feet in height in its adult state, has very long arms, and leads an essentially arboreal life.

Siamese Twins, the best-known example of two male individuals having their bodies connected inseparably from their birth, being joined by a thick fleshy ligament from the lower end of the breast-bone of each, having the common navel on its lower border, so that they stood in a sort of oblique position towards each other. Born in Siam in 1811, of a Chinese father and a Chino-Siamese mother, and named Eng ('right') and Chang ('left'), they were brought to the United States in 1829. They were on exhibition in Europe and America a number of times, and ultimately settled in the state of Pennsylvania. They married two sisters and had large families of children, none of whom exhibited any malformation. Chang received a paralytic stroke in 1870, and three years later was affected with an inflammatory disease of the respiratory organs. He died unexpectedly (Jan. 17, 1874) while his brother was asleep, and Eng died a few hours afterwards. The Siamese twins attracted great attention during their lifetime, particularly from physiologists and medical

men, some of whom thought that the ligament connecting them might have been cut without causing the death of either.

Sibbald, Sir Robert, Scottish physician and naturalist, born in 1641, was educated at Edinburgh, Leyden, and Paris, and settled in Edinburgh as a physician in 1662. He was the first professor of medicine in the University of Edinburgh, and the first president of the College of Physicians. He was also one of the founders of the botanic garden, and the author of numerous pamphlets and treatises on medicine, botany, zoology, and Scottish antiquities. In 1682, in recognition of his eminence in science and medicine, he was knighted by the Duke of York, then high commissioner in Scotland. He died in 1712.

Sibbal'dia, a genus of dwarf evergreen plants, natural order Rosaceæ, named after Sir Robert Sibbald (above). *S. procumbens*, a British plant, has trifoliate leaves and heads of small yellowish flowers. It is found on the summits of the higher mountains of Scotland, as well as in similar localities in Europe and America.

Sibe'ria, a great division of the Russian dominions. It occupies all North Asia, stretching uninterruptedly eastward from the Ural Mountains to the Pacific Ocean, and southwards from the Arctic Ocean to the Chinese dominions and Russian Central Asia. It has a total area of 4,824,570 sq. m., with a population of fully 5,000,000, and is divided into the governments of Tobolsk and Tomsk, the governor-generalship of Irkutsk, including the governments of Irkutsk and Yeniseisk, and the province of Yakutsk; and the governor-generalship of the Amur, including the province of the Amur, the province of Transbaikalia, the provinces of the Coast and the Anadir, and the island of Saghalin. The division into Western Siberia, Eastern Siberia, and the Amur regions was familiar for a number of years, but is no longer official. A region of such vast extent has naturally a very diversified configuration; but generally speaking Siberia may be considered as a vast inclined plane sloping gradually from the Altai, Sayan, and Yablonoi Mountains on the south to the Arctic Ocean on the north. In the east it is traversed in different directions by several mountain ranges, but elsewhere it is almost unbroken by any greater heights than a few hills. It is drained chiefly by the Obi (2120 miles), with its great tributary the Irtish (2520 miles), the Yenisei, and the Lena (3000 miles), all of which pursue a northerly course to the Arctic Ocean; and by the Amur (2700 miles, 2400 of which are navigable), which flows in an easterly and north-easterly direction to the Pacific. The principal lake is Lake Baikal in the south, 400 miles long, 20 to 53 broad, and 1560 feet above sea-level. The chief islands are the New Siberia group in the Arctic Ocean, and the island of Saghalin, off the mouth of the Amur, in the Sea of Okhotsk, an arm of the Pacific. The coast-line is very extensive, but the Arctic Ocean is ice-bound at least ten months out of the twelve, and is almost valueless for commercial purposes, and the Sea of Okhotsk, on the Pacific, is infested with masses of floating ice and dense fogs. The principal ports are Vladivostock, on the Sea of Japan, the chief naval station of Russia on the Pacific; Okhotsk, on the Sea of Okhotsk; and Petropavlovsk, on the east coast of Kamchatka. Siberia enjoys a warm summer, but the winter is exceedingly severe. South Siberia has, in many parts, a very fertile soil, which yields rich crops of wheat, rye, oats, and potatoes; but immense tracts of Siberia are utterly unfit for tillage, more particularly the *tundras* or great stretches of boggy country along the Arctic Ocean. In the west are extensive steppes. Roughly speaking, the northern limits of agriculture are 60° N. lat. Cattle-breeding and bee-keeping are largely pursued. Hunting and fishing are also sources of remuneration, ermines, sables, and other fur-bearing animals being numerous. The wild animals include the elk, reindeer, and other deer, bear, wolf, white and blue fox, lynx, &c. The forests are extensive and valuable. Manufactures and mining are in a backward state, though Siberia has very considerable mineral wealth. Large quantities of gold are obtained, as well as silver, platinum, lead, iron, coal, &c. The trade is mainly with Russia, which takes every year from Siberia about £4,000,000 worth of raw products, chiefly tallow, hides, furs, and grain; and sends every year to Siberia about £12,000,000 worth of manufactured wares. The foreign trade is insignificant. The chief towns are Irkutsk, capital of Eastern Siberia and a trading city; Tomsk, capital of gov. Tomsk, a trading city, with a university; and Tobolsk (20,130), capital of Western Siberia. Yermak the Cossack entered Western Siberia in 1580, and made a rapid conquest of the western portion of the country, which he handed over to Ivan

the Terrible of Russia. Bands of hunters and adventurers then poured across the Urals, attracted by the furs, and gradually penetrated to the Arctic Ocean and the Pacific. The latest acquisitions by Russia were the Amur territory, and coast regions of Manchuria, ceded by China in 1858 and 1860. Exile to Siberia began soon after the conquest, and ever since Siberia has been a great penal colony. Hardened convicts and important political offenders are kept under close control, but the great majority of the exiles are simply placed in a particular district and allowed to shift for themselves. The Russian population of Siberia, which is more than three-fourths of the whole, consists mainly of exiles or the descendants of exiles. The other inhabitants include Buriats, Yakuts, Tungus, Tartars, Kirghiz, Samoyedes, &c. Some railways exist in Western Siberia, and a great trunk-line is being laid across Siberia, running by way of Tomsk and Irkutsk to Vladivostock on the Pacific. Attempts have of late been made with partial success to open up an oversea trade between Britain and Siberia by way of the Kara Sea and the Yenisei River.

Sibi, a district of Southern Afghanistan, ceded to the British by the terms of the treaty of Gandamak in 1881; pop. 13,900. Its administration is carried on under the control of the governor-general's agent in Baluchistan. The town of Sibi has developed very largely since the cession, and especially since the opening of the Sind-Pishin Railway, on which it is a station.

Sibságar, chief town of Sibságar District, Assam Province, India, on the navigable Dikhu, 9 miles south of the Brahmaputra. It is the seat of some river trade, and has exports of cotton, rice, and, above all, of tea, Sibságar District ranking as the first tea-growing district in Assam proper. Pop. 5868.—The district, which is mostly a level plain intersected by tributaries of the Brahmaputra, has an area of 2855 square miles; pop. 370,274.

Sib'yl, the name common to certain women mentioned by Greek and Roman writers, and said to be endowed with a prophetic spirit. Their number is variously stated, but is generally given as ten. Of these the most celebrated was the Cumæan sibyl (from Cumæ in Campania). She is said to have written in Greek verses the collection of prophecies famous under the name of Sibylline books, and containing the *fata urbis Romæ*, which she offered to Tarquin the Proud for sale. When the king, on account of the high price asked, refused to buy them, she threw three of the books into the fire, and on a second refusal three more, after which the king, alarmed, paid for the three remaining the price originally asked for the whole. These books were preserved in the temple of Jupiter Capitolinus, and were consulted on occasions of national danger. In 83 B.C. they were destroyed by fire along with the temple, and the senate sent delegates to the Italian and Greek cities, especially to Erythræ, to collect whatever Sibylline verses they could find; and after the rejection of those which were considered spurious, about 1000 of them were retained, and preserved in the new temple of Jupiter Capitolinus. This collection of Sibylline oracles seems to have been burned by Stilicho shortly after 400 A.D. The so-called Sibylline oracles which have come down to modern times are of Jewish or Christian origin, dating from about 170 B.C. to 700 A.D.

Sicard (sē-kär), Roch-Ambroise Cucurron, famous in the history of the education of deaf-mutes, was born in 1742 near Toulouse, entered into holy orders, and was sent by the Archbishop of Bordeaux to Paris to study the method of the Abbé de l'Epée for the instruction of deaf-mutes. He became, in 1786, director of the school for deaf-mutes established by the Archbishop of Bordeaux in the city of that name, whence, in 1789, he removed to Paris as successor to the Abbé de l'Epée, in whose system he made some important improvements. He also wrote several works on the instruction of deaf-mutes. During the revolution he narrowly escaped with his life; and under the Directory it was only by concealing himself that he was enabled to avoid the consequences of a sentence of exile pronounced against him. He died in 1822.

Sicca, an Indian jeweller's weight of about 180 grains troy. The Sicca rupee, formerly current in India, contained about 176 grains of pure silver, and was equal to about 2*s.* 2*d.* sterling.

Sicilian Vespers, the name given to the outbreak of the insurrection in Sicily in 1282 against the French. Charles of Anjou (see next article) had established himself, through the favour of the pope, in possession of the Two Sicilies. He ruled with great severity, and the oppressed people applied in vain for relief to the pope. Giovanni di Procida, a nobleman of Salerno,

went to Aragon, and invited King Pedro, whose wife, Constantia, was a daughter of the former king, Manfred, to undertake the conquest of Sicily. Pedro embraced his proposals, and on March 30, 1282, at the hour of vespers on Easter Monday, the inhabitants of Palermo flew to arms and fell upon the French, who were all massacred. Before the end of April Messina and other towns followed the example of Palermo, and the Sicilian Vespers ended in the overthrow of the domination of Charles of Anjou and the establishment of the Aragonese dynasty.

Sicilies, KINGDOM OF THE TWO, a former kingdom of Italy, consisting of Naples (or South Italy) and Sicily. In 1047, while Greeks and Saracens were struggling for the possession of Lower Italy and Sicily, the twelve sons of Tancred de Hauteville, a count in Lower Normandy, came in with their followers. Robert Guiscard, one of these brothers, subdued Apulia and Calabria, taking the title of duke, and his youngest brother, Count Roger, conquered Sicily. Roger's son and successor, Roger II., completed the conquest of all Lower Italy by subduing Capua, Amalfi, and Naples, at that time celebrated commercial republics, and in 1130 took the title of king, calling his kingdom the Kingdom of the Two Sicilies. In 1189 the race of Tancred became extinct, and the German emperor, Henry VI., of the house of Hohenstaufen, claimed the kingdom in right of his wife, Constantia, the daughter of Roger II. The kingdom remained with the family of Hohenstaufen until 1266, when Pope Urban IV., feudal overlord, bestowed it upon Charles of Anjou, brother of Louis IX. of France, who caused the legitimate heir, Conradin of Suabia (1268), to be beheaded. Sicily, however, freed herself in 1282 from the oppressions of the French (see *Sicilian Vespers*) by the aid of King Pedro of Aragon, and Naples was now separated from it, Sicily being under the Kings of Aragon, while Naples was under the Angevin dynasty. This dynasty was dispossessed in 1442 by Philip V. of Aragon, who bestowed Naples on his natural son Ferdinand. In 1504 Sicily was again united to Naples under the Spanish crown, and governed by viceroys until 1713, when the Peace of Utrecht again divided the Two Sicilies, Naples falling to Archduke Charles of Austria, Sicily to Duke Victor Amadeus of Savoy. King Philip V. of Spain reconquered Sicily in 1718, at the instigation of Alberoni, but was forced to cede it to Austria in 1720, Savoy receiving Sardinia in exchange, by which means the Two Sicilies became a part of the Austrian dominions. In 1734 the Spanish Infante Don Carlos, son of Philip V., at the head of an army invaded Naples, conquered both the continental and the insular part of the kingdom, and was crowned at Palermo in 1735 as Charles IV. This change was sanctioned by the Treaty of Vienna (1738), and till 1860 this line of the Bourbon family maintained possession of the Two Sicilies, except for a few years during the Napoleonic period, when Joseph Buonaparte and Joachim Murat reigned on the mainland as kings of Naples. In 1759, when Charles IV. ascended the Spanish throne under the name of Charles III., he conferred the Kingdom of the Two Sicilies on his third son Ferdinand, and decreed at the same time that it should never again be united to the Spanish monarchy. The reign of Ferdinand extended through the stormy period of the French revolution and the subsequent European commotions. (See *Ferdinand I.*) His successors, Francis I., Ferdinand II. (Bomba), and Francis II. were despotic tyrants who forced the people into periodic revolt, put down with much severity. In 1860, however, an insurrection broke out in Sicily, and an expedition of volunteers from Piedmont and other Italian provinces under Garibaldi sailed from Genoa to the assistance of the insurgents. The result was that the Neapolitan troops were driven from the island. Garibaldi, following up his success, crossed over to the mainland, where he met little or no opposition; Francis II. fled from Naples; the strong places in his hands were reduced; and by a popular vote the Kingdom of the Two Sicilies ceased to exist as such, and became an integral part of the Kingdom of Italy. See *Italy.*

Sicily, the largest island of the Mediterranean, belonging to Italy, from the south-western extremity of which it is separated by the narrow strait of Messina, about 2 miles wide; area, 11,289 sq. miles, divided into seven provinces; pop. 3,192,108. It is triangular in shape, ending in the three capes of Faro on the N.E., Passaro on the S., and Boeo on the W.; whence the ancient poetical name of Trinacria. The north and east coasts are steep and cliffy, and are provided with good harbours, the finest being that of Palermo; the south and west coasts are flatter and less indented. The greater part

of the surface consists of a plateau of varying elevation. Considerable mountains occur in the north, beginning at the north-eastern extremity of the island, where they are evidently a continuation of the mountains on the other side of the Strait of Messina. They reach heights varying from 4000 to 6000 feet. The lower slopes of these mountains are clothed with olive-yards and orange-groves, mulberry gardens and vineyards, and their higher slopes with forests of oak and chestnut. The highest elevation in Sicily is the active volcano of Etna, in the east of the island, which rises to a height of 10,874 feet. (See *Etna.*) To the south of Etna, on the east coast, is the plain of Catania, the only plain of any great extent. It is watered by the Simeto. The principal perennial streams, besides the Simeto, are the Salso, Platani, and Belice. The climate, as in the other regions of the Mediterranean, is mild and equable, but its salubrity is impaired by the sirocco, and, locally, by the occurrence of malaria. The soil is very fertile. Three-fourths of the cultivated surface are covered with cereals, chiefly wheat, though oats and barley are also grown. Cotton, sugar, and tobacco are also cultivated to some extent. Fruits of every variety are extensively grown, including large quantities of oranges and lemons. The vine flourishes almost everywhere, and much wine is produced. The chief exports are fruits, wine, and sulphur, besides olive-oil, sumach, cream of tartar, &c. Sicilian sulphur is extensively exported, the centre of this trade being Girgenti on the south coast. Tunny and sardine fisheries are carried on round the coast. Manufactures are but little developed. The chief seats of foreign commerce are the three principal towns, Palermo, Messina, and Catania. The system of roads and railways is still defective. Agriculture is generally carried on in a very primitive manner, and the rural populations are in a very rude and debased condition. Education is extremely backward; life and property are by no means secure, and brigandage still exists, as well as the custom of the vendetta.—At the dawn of history the older races inhabiting Sicily, the Iberian Sicani, from Iberia (Spain), and the Siculi from Italy, are seen to be hemmed in by Phœnician and Greek colonies. The Greeks, who entered the island in the 8th century B.C., founded the great cities of Syracuse, Agrigentum, and Messina, drove the Phœnicians to the north-west coast, and spread their influence and culture over the whole island. Greek art and literature here flourished, and many Greek names of distinction are connected with Sicily. The Carthaginians latterly took the place of their kinsmen, the Phœnicians, and between them and the Greeks a struggle ensued, which ended in favour of the latter (480 B.C.). War with the Carthaginians (1st Punic war) brought the Romans to Sicily, and having acquired the Carthaginian portion of the island (241 B.C.) they extended their rule over the whole, Sicily becoming a Roman province in 212 B.C. On the decline of the Roman Empire the island was overrun by the Goths, who retained possession till A.D. 551, when Sicily became part of the Byzantine Empire. In the beginning of the 9th century the Saracens became masters, and continued so till their expulsion by the Normans in the 11th century, who remained long enough in possession to establish the feudal system in all its rigour. For a continuation of the history of Sicily see *Sicilies* (*Kingdom of the Two*).

Sickingen, FRANZ VON, a famous German knight of large possessions in the Rhine valley, was born in 1481, and from early youth devoted himself to the military life. He aided the emperors Maximilian I. and Charles V. in their wars, engaged in repeated private feuds of his own; gained great renown as a protector of the poor and oppressed; was a friend of the Humanists and Reformers, and under the influence of Ulrich von Hutten, formed a scheme to carry through the Reformation by force, and abolish the ecclesiastical principalities. He began the war by an attack on the Archbishop of Treves, but was assailed by the landgrave of Hesse and the count palatine of the Rhine, and at last he was compelled to surrender, mortally wounded, together with his last castle, Landstuhl, near Kaiserslautern. He died the day after the capitulation, May 7, 1523.

Sickle, a reaping-hook; a curved blade of steel with a handle, and having the edge of the blade in the hollow of the curve, used for cutting grain and the like. The sickle has been mostly superseded by the scythe, and the scythe in turn has given place to the reaping-machine.

Sicyon (sis'i-on), a city of ancient Greece, in the northern part of the Peloponnesos, near the Gulf of Corinth, on which it had a port. Sicyon was celebrated for its schools of sculpture and painting. At first

dependent upon Argos, it was afterwards closely allied to Sparta, which it aided in the Peloponnesian war. Under Aratus (251 B.C.) it became one of the most important cities of the Achæan league, of which it finally shared the fate, falling under the dominion of Rome. In the 2d century A.D. it was almost depopulated.

Sida, a genus of herbs and shrubs, natural order Malvaceæ, the numerous species of which are extensively distributed throughout the warm parts of the world. Like all malvaceous plants they abound in mucilage, and some species are employed in medicine, especially in India, while others have tough ligneous fibres which are used for cordage in various countries.

Siddons, Mrs. Sarah, daughter of Roger Kemble, the manager of an itinerant company of players, was born at Brecon, South Wales, in 1755. She commenced her theatrical career when quite a child, and in her nineteenth year was married to William Siddons, an actor in her father's company. In 1774 she met with the first recognition of her great powers as an actress at Cheltenham in consequence of her representation of Belvidera in Venice Preserved. Her success at Cheltenham procured for her an engagement at Drury Lane, but her first appearance there was a comparative failure, and in 1777 she again went on circuit in the provinces. Her second appearance at Drury Lane took place October 10, 1782, in the character of Isabella in the Fatal Marriage. Her success was complete, and she was universally acknowledged to be the first tragic actress of the English stage. For thirty years she continued to astonish and enchant the lovers of the drama, and having acquired an ample fortune, she took her leave of the stage in 1812. Her greatest characters were Queen Catharine in Henry VIII., and Lady Macbeth. In her art she was a close and systematic student, while in private life she enjoyed the respect of all who knew her. She died June 8, 1831.

Sidereal System. See *Stars*.

Sidereal Time, time measured by the apparent motion of the stars. A *sidereal day* is the time from the passage of a star across the meridian till its next passage, and is exactly the period of the revolution of the earth on its axis. It is the most constant unit of time which we possess. Its length is 23 hours 56 minutes 4·098 seconds. A *sidereal year* is the period in which the fixed stars apparently complete a revolution and come to the same point in the heavens, and is the exact period of the revolution of the earth round the sun. There are 366·2563612 sidereal days in a sidereal year. See *Day*.

Sid'erite, in mineralogy, an important iron ore, also called spathic iron ore. See *Iron*.

Sideroxylon. See *Iron-wood*.

Sidgwick, Henry, M.A., Lit.D., writer on moral philosophy, was born at Skipton, Yorkshire, 1838, was educated at Rugby and Trinity College, Cambridge, and became a fellow and lecturer of his college in 1859. In 1875 he was appointed prælector of moral philosophy in Trinity College, and in 1883 Knightbridge professor of moral philosophy in the University. His works include Methods of Ethics (1874), Principles of Political Economy (1883), and Outlines of the History of Ethics (1883).

Sidi-Bel-Abbès, a fortified town of Algeria, in the department of Oran, 48 miles by rail south of Oran, on the Mekerra, in a healthy, fertile, and populous plain. It is a town of quite recent origin, and is the centre of one of the chief esparto-grass districts in Algeria. Pop. 21,595.

Sidlaw Hills, in Scotland, commence with Kinnoull Hill on the left bank of the Tay near Perth, and stretch E.N.E. into Forfarshire. They reach a height of 1493 feet.

Sidmouth, a market town and watering-place of England, in Devon, 15 miles E.S.E. of Exeter, situated in a valley between two high hills, near the mouth of the Sid. It was formerly a seaport of importance; but the harbour became choked up, so that no craft except pleasure-boats and fishing-smacks could approach the town. Pop. 3758.

Sidmouth, Viscount. See *Addington, Henry*.

Sidney, or Sydney, Algernon, second son of Robert, second earl of Leicester, and of Dorothy Percy, daughter of Henry, earl of Northumberland, was born at Penshurst, Kent, in 1622. He accompanied his father in his embassies to Denmark and France. He was also early trained to a military life, and served with some distinction in Ireland, where his father was lord-lieutenant. In 1643 he returned to England, and joined the parliamentary forces. In 1644 he was lieutenant-colonel of a regiment of horse in Manchester's army, and was severely wounded at Marston Moor. In 1645 he was given the command of a cavalry regiment in Cromwell's division of Fairfax's army, and was returned to parliament for

Cardiff. He was nominated one of the commissioners to try Charles I., but took no part in the trial, although he approved of the sentence. He refused all concurrence in the government of Cromwell, retiring to Penshurst, but when the return of the Long Parliament in May 1659 gave expectations of the establishment of a republic, he again took his seat, and was nominated one of the council of state. He was soon after appointed a commissioner to mediate a peace between Denmark and Sweden, and while he was engaged in this embassy the Restoration took place. Conscious of the offence he had given the royal party, he refused to return, and remained an exile for seventeen years. At length, in 1677, the influence of his friends procured him permission to return to England. After the death of Shaftesbury in 1682, he entered into the conferences held between Monmouth, Russell, Essex, Hampden, and others, and on the discovery of the Rye House Plot he was arrested and sent to the Tower on a charge of high treason. He was tried before the notorious Chief-justice Jeffreys, and his trial was conducted with a shameless absence of equity which has conferred upon him all the glory of a martyr. He was executed on Tower Hill, December 7, 1678. His Discourses concerning Government were first printed in 1698.

Sidney, Sir Philip, one of the most conspicuous figures at the court of Queen Elizabeth, was the son of Sir Henry Sidney of Penshurst, Kent, where he was born in 1554. He became a favourite with the queen, who in 1577 sent him on an embassy to Germany. In 1583 he married Frances, daughter of Sir Francis Walsingham, and the same year he received the honour of knighthood. In 1585 he went to the Netherlands with his uncle Dudley, earl of Leicester, who commanded the forces sent to assist the Dutch against the Spaniards, and he was appointed governor of Flushing and general of horse, but at Zutphen, Sept. 22, 1586, he was mortally wounded, and died at Arnheim, Oct. 7. He was a man of versatile gifts, and made his mark in many ways. He was a soldier and statesman of great promise, and his contributions to literature, though not numerous, were of great importance. They include the Arcadia (1590), a romance in a medley of prose and verse in an Italian style then popular; Astrophel and Stella (1591), the first important body of sonnets in the English language; and the Defence of Poesy, first published in 1595 as an Apologie for Poetrie.

Sidney Sussex College, Cambridge, was founded in 1595 by Lady Frances Sidney, countess-dowager of Sussex, aunt to Sir Philip Sidney. Oliver Cromwell and Thomas Fuller were members of this college.

Sidon, or Zidon, a seaport of Syria, situated on the eastern coast of the Mediterranean, between Lebanon and the sea, about midway between Beyrout and Tyre, was long the principal city of Phœnicia (1600–1300 B.C.). Its artistic products were famous at an early period, as also its manufactures of glass, linen, purple dye, and perfumes, and in commercial enterprise it occupied a distinguished position. In the Persian, Grecian, and Roman periods it was still great and populous, and even in the middle ages it was a place of considerable importance. During the crusades it was taken and retaken several times. It was almost completely destroyed during the troubles of the 13th century, but in the 15th it reappeared, under its modern name of Saida, as the port of Damascus. The trade is now unimportant. Pop. 9000.

Siebenbürgen (zē'ben-bûr-gen). See *Transylvania*.

Siebengebirge (zē'ben-ge-bir-gé; 'Seven Mountains'), a small mountain range of Germany, on the right bank of the Rhine, not far from Bonn. Seven mountains tower above the rest, of which the Drachenfels, close to the Rhine, and presenting a splendid view from the river, is the most beautiful. On all of them are ruins of ancient castles.

Siebold (zē'bolt), Philip Franz von, scientific explorer of Japan, born at Würzburg, Germany, 1796; died 1866. He studied medicine, and entered the service of the king of the Netherlands as medical officer in the East Indian army, and on his arrival at Batavia was attached to a mission to Japan. His medical qualifications gained him the favour of the Japanese, and enabled him to collect a vast amount of information concerning that country, then so little known. On his return to Europe he published a number of valuable books on Japan, and founded the Japanese Museum at Munich. His brother, Karl Theodor Siebold (1804–1885), has published several standard works on zoology.

Siedlce (syed'l-tse), a town of Russian Poland, capital of the government of the same name, 57 miles E.S.E. of Warsaw, the seat of a bishop. Pop. 12,950.—The govern-

ment of Siedlce, between the Vistula and the Bug, has an area of 5535 sq. m., and a pop. of 652,986.

Siege, the surrounding or investment of a fortified place by an army with a view to its capture. The taking of a fortified place may be attempted (1) by surprise, (2) by a sudden onset, (3) by blockade out of gunshot (see *Blockade*), (4) by a siege, properly so called. In a regular siege the fortress is first blockaded, so as to cut off all intercourse from without, the besieging force encamping just beyond reach of the enemies' guns. Then if any detached works are situated before the fortress, their capture must be effected in order to admit the opening of the trenches. The trenches are formed in the direction of the fortress; but that they may not be enfiladed from thence, they must proceed in a zigzag form. (See *Sap.*) For the protection of the workers trenches called *parallels*, because they run in a direction parallel or nearly so to the sides of the fortress, are dug at intervals. While the trenches are being opened, the besieged, by sallies and counter operations of every kind, strive to drive off the besiegers, and to destroy their work; and the besiegers make efforts to establish themselves more and more securely, to raise batteries, and then, by means of trenches and advanced parallels, to approach the walls of the fortress; and all the while the artillery is kept constantly playing from the batteries of the besiegers as well as from the works and guns of the besieged. From the last parallel, which approaches very near the fortress, the besiegers prepare to make breaches. Here likewise mining operations are carried on whenever they are found advisable. When at last the breaches are practicable the storming or scaling of the walls follows.

Siegen (zē′gĕn), a town of Germany, in the Prussian province of Westphalia, on the Sieg, 47 miles east of Cologne. It is an ancient place, with manufactures of leather, paper, soap, linen, &c., while in the vicinity are numerous iron-mines and smelting furnaces. Pop. 16,676.

Siegfrid. See *Sigurd.*

Siemens, Sir Charles William, engineer, born in Hanover, 4th April 1823, was educated at the gymnasium at Lübeck, the polytechnic school at Magdeburg, and the University of Göttingen. After a training in engineering and electricity in the workshops of Count Stolberg he migrated to London in 1843, and at a later date was joined by his brother (Werner), who joined with him in his various undertakings. The great works of Siemens Brothers at Charlton, West Woolwich, for the manufacture of submarine electric telegraph cables, were established in 1858; and the great steelworks at Landore, Swansea, in 1868. He laboured mainly in two distinct fields, the applications of heat and the applications of electricity, and won a great reputation in both. He was knighted, April 1883, in recognition of his services, which had been previously recognized by numerous scientific societies, and by the Universities of Oxford, Glasgow, Dublin, and Würzburg. He died Nov. 19, 1883. Werner died in 1892.

Siena (sē-ā′nà), or Sienna (anciently *Sena Julia*), a city of Central Italy, on three connected hills on the southern frontiers of Tuscany, 59 miles south of Florence, is surrounded by old walls, entered by nine gates, and has also a citadel; the streets are irregular, steep, and narrow. It has a university with faculties of law and medicine, and a cathedral, begun in the early years of the 13th century, which is one of the finest examples of Italian Gothic architecture. The municipal palace, begun in 1288, is a fine specimen of Pointed Gothic. It stands in the historic Piazza del Campo, now the Piazza di Vittorio Emanuele, a large open semicircular space in the centre of the city, and is adorned with frescoes of the Sienese school. The institute of fine arts contains a valuable collection of pictures of the older Sienese painters. There are various other buildings of interest, including churches and palaces. The manufactures are not of much importance. In the middle ages Siena gave its name to a school of painting, and was the birthplace of famous painters, sculptors, and architects. It was long the powerful rival of Florence, but was annexed to Tuscany in 1557. Siena is the seat of an archbishop. Pop. 25,204.

Sien'na, or Sienna Earth (It. *terra di Sienna*, 'earth of Sienna'), a ferruginous ochreous earth, which when raw is of a fine yellow colour, and when burned assumes a rich orange-red tint. It is used as a pigment in both oil and water-colour painting.

Sieradz (syā′rądz), a town of Russian Poland, government of Kalish, on the Warta, 127 miles S.W. of Warsaw. It is an ancient place, having been founded prior to the introduction of Christianity. Pop. 6418.

Sierra (sē-er′rà; Spanish, 'a saw'), a term applied in Spain and Spanish-peopled countries to a ridge of mountains.

Sierra Leone (si-er'ra le-ō'ne), a British colony on the coast of Western Africa; a coaling station for the Royal Navy, and the head-quarters of the West India regiments stationed on the West Coast of Africa. The colony consists of the peninsula of Sierra Leone proper, Sherbro Island and several other small islands, and the whole coast region from the French territory on the north-west to that of Liberia on the south-east; area in occupation, 468 square miles; of entire colony, about 15,000 sq. miles. The inhabitants depend chiefly upon trade, and are mostly collected in Freetown (the capital) and the neighbouring villages. The exports are palm kernels, palm-oil, rubber, ground-nuts, kola-nuts, gum-copal, hides, ginger, and benné-seed. The trade is chiefly with Great Britain. The annual exports amount to about £450,000, and the imports to about £430,000. Education is purely denominational, but is assisted by state aid. Fourah Bay College, for the education of a native ministry supported by the Church Missionary Society, is affiliated with Durham University. Sierra Leone is a crown colony under a governor, who is assisted by an executive and a legislative council. It first became a British colony in 1787, when a company was formed with the intention of making it a home for rescued slaves. One great obstacle to the prosperity of the colony is the deadly nature of its climate, particularly to Europeans, and Sierra Leone was long known as the 'white man's grave'. But Freetown (pop. 40,000), in particular, has become healthier since getting a supply of good water, with other sanitary improvements. It is the chief seaport of western Africa. Pop. 74,835.

Palazzo Pubblico or Municipal Buildings, Siena.

Sierra More'na, a chain of mountains in Spain, between New Castile and Andalusia, separating the Guadiana on the north and the Guadalquivir on the south, and attaining a height of 5500 feet above sea-level.

Sierra Neva'da (Spanish, 'Snowy Range'), a chain of mountains in Southern Spain, the most elevated in the peninsula. The greater part of it is in the province of Granada, running east and west, and the highest peak is Mulahacen, which has an elevation of about 11,678 feet, and is capped with everlasting snow. The range is rich in fertile valleys and picturesque scenery.

Sierra Nevada, a mountain range of the United States, in California, extending north and south along the eastern boundary

of the state. It consists of an aggregate of ranges, some 70 miles wide, with numerous peaks reaching 10,000 and several nearly 15,000 feet, Mt. Whitney (14,868) being the highest in the States. The Yo-Semite Valley is in the Sierra Nevada.

Sieyès (sye-yās), EMMANUEL JOSEPH, better known as the Abbé Sieyès, was born at Fréjus in 1748, and pursued his studies for the church at Paris. He was active in furthering the progress of the revolution, and soon acquired great influence in the National Assembly. He originated the idea of the new geographical division of France into departments, arrondissements, and communes. In 1791 he became member for the Seine department, and in 1792 deputy for the department of Sarthe. During the Reign of Terror he withdrew into the country, but after Robespierre's downfall he returned to the convention and took an active part in affairs. In 1799, on his return from a mission to Berlin, by which he secured the neutrality of Prussia, he became a member of the directory. He subsequently suppressed the Jacobin Club, and was active in bringing about the overthrow of the directory and the substitution of the consular government by the revolution of the 18th Brumaire, the new constitution being devised by him. But Sieyès soon found his speculations completely overmatched by Bonaparte's practical energy, and though a consul provisionally, he saw it desirable to terminate his political career. He retired with the title of count, and obtained grants of land and property to the value of at least £50,000. He was exiled at the restoration, but returned on the July revolution of 1830, and died at Paris in 1836.

Sight, DEFECTS OF, are usually caused by anomalies in the shape of the eye. (See *Eye.*) The normal eye is an optical apparatus so constructed that the images of distant objects are thrown with sharpness on the retina; if this is not the case the objects are not seen distinctly. There are two very common instances of defective eyesight, short-sight or *myopia* and long-sight or *hypermetropia*, the one being the reverse of the other. In the former case, owing to the too great power of the crystalline lens, or to the eye cavity extending too far backwards, images from objects at some distance are formed in front of the retina. The sight of the myope is thus confused or absolutely defective for objects beyond a certain short range, but on the other hand it is very clear for near objects. The remedy for myopia is the employment of biconcave glasses, which, if the myopia is not considerable, need only be used for looking at distant objects. In the case of *hypermetropia* objects are seen distinctly only at a range beyond that belonging to normal vision. Owing to the shortness of the eye cavity the lenses in this case are unable to converge the rays to a focus within the limits of the eye-chamber, the image being therefore formed (theoretically) behind the eye. This defect is corrected by the use of convex lenses, which, by converging the rays of light, cause the image to fall on the retina. Both these defects are usually congenital. A similar defect to hypermetropia is that of *presbyopia* (Greek *presbys*, old), which usually comes on with advancing years, and is due to diminished focussing power and lessened elasticity of the lens, the result being that the image of a near object is not clearly formed on the retina but behind it, while distant objects are seen as well as ever. The remedy in this case also is convex lenses. *Astigmatism* is a defect usually characterized by asymmetry in the curvature of the cornea in different meridians. (See *Astigmatism.*) Opacities in the cornea or crystalline lens, &c., are also not uncommon causes of defective eyesight.—*Double-vision* is when, as in some cases of squinting, each eye sees things separately; or it may result from muscular paralysis.—*Night-blindness* or *hemeralopia* is a peculiar defect by which a person becomes suddenly and entirely blind when night comes on, though he can see perfectly well in the daytime. See *Night-blindness.* See also *Colour-blindness* and *Squinting.*

Sigillaria, a genus of fossil plants found

Sigillaria in a Coal-mine near Liverpool.

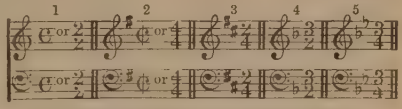
in great abundance in the coal measures. The plant occurs in the form of compressed stems attaining a height of 40 to 50 feet, and

a breadth of 5 feet. The stem generally occurs as a double layer of coal with a fluted outer surface, and showing, at regular intervals, the scars produced by the bases of the leaf-stalk. Their roots are found in the shale, and are known by the name of *stigmaria*, being at first supposed to be distinct plants. No foliage of any kind has been found connected with the trunk. Some suppose sigillarias to be allied to tree-ferns, others to Coniferæ.

Sigismund (sij'is-mund), German emperor from 1411–37, was born in 1368, and on the death of his father, the emperor Charles IV., he obtained the margraviate of Brandenburg. He married Mary, daughter and heiress of Louis the Great of Poland and Hungary; but on the latter's death in 1383 the Poles elected Mary's sister as queen; Sigismund, however, was crowned king of Hungary in 1387. He was subsequently involved in a war with Turkey, and being defeated by Bajazet at Nicopolis in 1396, he fled into Greece. On his return to Hungary in 1401 he was made prisoner, and the nation gave the throne to Ladislaus of Naples. Sigismund escaped, and having raised a powerful force, reduced Hungary to subjection. In 1411 he was elected emperor of Germany, and crowned at Aix-la-Chapelle. He took a leading part in the Council of Constance in 1414, but disgraced himself by allowing John Huss, to whom he had granted letters of safe-conduct, to be put to death. On the death of Wenceslaus in 1419 the Hussites refused to acknowledge his succession to the kingdom of Bohemia until he had signed the compact with the Council of Basel in 1431. He was then crowned emperor at Milan, and again at Rome in 1433. He was now in possession of the imperial crown and the crown of four kingdoms. He died at Znaim in 1437.

Signals are the means of communicating to the eye—as by flags, lights, &c., and to the ear—as by guns, steam-whistles, fog-horns, rockets, &c., intelligence to greater distances than can be reached by the human voice. The most complete system of signalling is that devised to enable ships to communicate when at some distance. The system now in general use is a combination of square and triangular flags of the same length, and of pendants which are a little longer. These are coloured in a very distinct manner, the colours being white, red, blue, and yellow, with black balls for distance signals. Solid figures of canvas on iron frames have also been used; but the cone, cube, cylinder, and sphere, which present the same appearance seen from all points, are the only figures available. Consequently the number of signs is limited, and this renders a code desirable. A word may be easily spelled by hanging many flags one above another, but with flags to represent a few symbols—*e.g.* the nine numerals, or a certain number of letters—a combination of two, three, or four symbols may be taken arbitrarily to represent a word or phrase; this system of arbitrary signals is a code. The international code of signals consists of eighteen flags representing as many consonants, and with these over 70,000 distinct signals may be made without hoisting more than four flags at once. In the army signalling is carried on during the day by means of flags, sun-flashes (see *Heliograph*), &c.; and during the night by means of coloured lamps, or by a system of long and short flashes of light. On the railways signalling is effected by the semaphore, coloured lights, and during fog by cases filled with detonating powder and placed on the rails at certain places, to be exploded by the wheels of the passing locomotive. See *Fog-signals* and *Heliostat*.

Signature, in music, the signs placed at the commencement of a piece of music. They are of two kinds, the time signature and the key signature. The key signature, including the clefs, is usually written on every stave; and the sharps or flats there occurring affect all notes of that degree (with their octaves) throughout the piece. The time signature is only placed at the beginning of the first line and where changes occur. It indicates the number of aliquot parts into which the bar is divided, as shown above.



Key and Time Signatures on the Treble and Bass Clefs.

1, Key of C; two minims (or their equivalents) in the bar. 2, Key of G; four crotchets in the bar. 3, Key of D; two crotchets in the bar. 4, Key of F; three minims in the bar. 5, Key of B flat; three crotchets in the bar.

Signature, among printers, a number or letter placed on the first page of each sheet of a book, to distinguish the sheets and serve as a guide to the binder.

Signet, in England, one of the royal seals, used for the authentication of royal grants. In Scotland the signet is a seal by which royal warrants for the purpose of justice seem to have been at one time authenticated. The *clerks to the signet* or *writers to the signet* are a class of legal practitioners in Scotland who formerly had important privileges, which are now nearly abolished. They act generally as agents or attorneys in conducting causes before the Court of Session.

Sign-manual, ROYAL, the signature of the sovereign, which must be adhibited to all writs which have to pass the privy seal or great seal. The sign-manual consists usually of the initial letter of the sovereign's name, with the letter R (for *rex* or *regina*) added.

Signorelli (sēn-yo-rel'lē), LUCA (called also, from his birthplace, LUCA DA CORTONA), a celebrated Italian painter, was born at Cortona about 1441, and studied under Piero della Francesca at Arezzo. He began to distinguish himself about 1472, and painted till 1512, or perhaps later. He was the first to apply anatomical knowledge to painting, and thus became the precursor of Michael Angelo. His greatest works are a series of magnificent frescoes in the cathedral of Orvieto, comprising the History of Antichrist, the Resurrection of the Dead, Hell and Paradise. These frescoes were finished between 1499 and 1502. Of his other works the most remarkable are the Madonna Enthroned, in the cathedral of Perugia; the Adoration of the Magi, now in the Louvre; the Annunciation, and a Madonna, at Volterra. Signorelli was a man of high character, and died at Arezzo about 1525.

Signs, ASTRONOMICAL. See *Symbols* (*Astronomical*).

Signs, MATHEMATICAL, symbols which indicate mathematical processes and conditions. $a+b$, $a-b$, $a \div b$, $a \times b$, and $a \sim b$ read a plus b, a minus b, a divided by b, a multiplied by b, and the difference between a and b; $a > b$, $a < b$, $a = b$, $a \equiv b$, and $a - b$ read a greater than b, a less than b, a equal to b, a approximately equal to b, and a identical with b; $\int$ is the sign of integration; $\therefore$ denotes *then* or *therefore*, and $\because$ denotes *since* or *because*; $\sqrt{a}$, $\sqrt[3]{a}$, $\sqrt[n]{a}$ represent the square root, the cube root, and the nth root of a.

Sig'ourney, MRS., whose maiden name was Lydia Huntley, an American authoress, was born at Norwich, Connecticut, 1791; died at Hartford, in the same state, 1865. In 1815 she published a volume entitled Moral Pieces in Prose and Verse, which was quickly followed by other works, most of which enjoyed great popularity. Among her principal poems are: Traits of the Aborigines of America, Zinzendorf, The Western Home, and Pocahontas. Her prose works are mainly biographical, historical, didactic, and epistolary.

Siguenza (sē-gen'thȧ), a town in Spain, in the province of Guadalajara, 72 miles north-west of Madrid. It is a place of considerable antiquity, and contains a fine Gothic cathedral. Pop. 4567.

Sigurd, or SIGURDR, in northern mythology, the hero of the Volsunga Saga, on which the Nibelungenlied is based. According to the legend of the Volsungs, Sigurd (the Siegfried of the Nibelungenlied) is the posthumous son of Sigmund, son of Volsung, a descendant of Odin. After obtaining the golden treasure by slaying the dragon Fafnir with his good sword Gram he eats the monster's heart, and thus acquires the power of understanding the songs of birds. He then rides through a volume of flame surrounding a house in which the fair Brenhyldr (Brunhild) lay asleep. He wakes Brenhyldr, to whom he plights his troth, and then rides to the palace of Giuki the Niflung, whose wife gives him a potion which causes him to forget Brenhyldr, and he marries Gudrun (Chriemhild), Giuki's daughter. Her brother Gunnar (Gunther) determines to marry Brenhyldr, but is unable to ride through the flames; so his mother by her arts causes Sigurd to go through the flames and bring away Brenhyldr in the form of Gunnar. Sigurd then resumes his shape, and Brenhyldr is handed over to Gunnar. When Brenhyldr hears the true story of her rescue her love for the hero turns to hatred, and she seeks to slay him. Sigurd is eventually killed by Gunnar's half-brother. His death revives Brenhyldr's love, and she dies of a broken heart.

Sihon. See *Sir-Daria*.

Sikandarabad. See *Secunderabad*.

Sikhs (from a Sanskrit word meaning 'disciple'), a religious sect in North-western Hindustan which worships one only and invisible God. Its founder was Nanak Shah, born in 1469 in the province of Lahore. He laboured to lead the people to a practical religion, to a pure worship of God and love to mankind. He died about 1540. Of his successors Arjun-mal gave stability and unity to the religion by publishing Nanak's writings in the Adi-Granth, the first sacred book of the Sikhs. The Sikhs had now

rejected the authority of the Koran and the Vedas, and thus aroused the enmity both of the Mohammedans and Brahmans. Arjunmal was thrown into prison, where he died. His son and successor Har Govind transformed the Sikhs from peaceful believers into valiant warriors, and under his reign began the bloody contest with the Mohammedans. The real founder of the Sikh state was Govind Sinh or Singh, the tenth ruler from Nanak. He abolished the system of castes, and gave all men equal rights. His followers, owing to their valour in the protracted contest with the Mohammedans, received the title of Sinhs or lions. Govind Sinh wrote the Dasema Padshah ke Granth, or book of the tenth prince, which, besides treating of religious subjects, contained the history of the author's exploits. The Sikhs hold it in equal veneration with the Adi-Granth. Govind Sinh died in 1708, and the Sikhs gradually yielded to the superior power of the Mohammedans. A small number of the Sikhs escaped to inaccessible mountains, and preserved the doctrines of their fathers and an inextinguishable hatred towards the Mohammedans. After Nadir Shah's return to Persia they left the mountains and subdued all Lahore. The Sikhs then broke up into a number of independent communities, each governed by a *sirdar;* but in 1792 Runjeet Singh established himself as despotic ruler of the Sikhs, with the title of Maharajah. The territory of the Sikhs now comprehended the whole Punjab, part of Multan, and most of the country between the Jumna and Sutlej; total area, 69,000 sq. miles. After Runjeet Singh's death in 1839 a period of anarchy followed. In 1845 (first Sikh war) the Sikhs attacked the British under Sir Hugh Gough at Mudki. Here they were repulsed (December 18), and again defeated at Ferozeshah three days later. On January 20, 1846, the Sikhs were routed by Sir H. Smith near Aliwal, and on the 10th February by Gough at Sobraon. A treaty was signed by which Britain held the city of Lahore, and a British resident took supervision of the government. In 1848 a general revolt broke out, and it was evident that the Sikhs had resolved on a decisive struggle, being also assisted by the Afghans. In this the second Sikh war Lord Gough advanced with an army against them, but received a severe check at Chillianwalla, 13th January, 1849. Both armies were then reinforced, and on the 21st February, at Gujerat, the power of the Sikhs was completely broken. The Sikh dominion was proclaimed at an end on the 29th March, and the Punjab was annexed to the British Empire in India, the Maharajah Dhulip Singh receiving an

Sikh Soldiers.

annuity of £50,000. (See *Punjab.*) The bulk of the Sikhs are of Jât origin; they are of fine physique, and possess great powers of endurance as well as courage. During the mutiny the Sikhs displayed the utmost loyalty to the British. They number about 1,876,500, or $\frac{1}{15}$th of the population of the Punjab, and compose the mass of the gentry in the region between the Five Rivers.

Si-kiang, or WEST RIVER, China, by far the most important of the streams which unite to form the Canton River. It is navigable for vessels drawing 12 feet 75 miles from the sea. See *Canton.*

Sik'ino (ancient *Sikinos*), a small island of the Cyclades, in the Grecian Archipelago, east of Melos; area, 17 square miles. Pop. 300. The surface is lofty, but the soil is fertile. The staple product is wine.

Sikkim, a rajahship under British protection in North Hindustan, bounded on the north and north-east by Tibet, south-east by Bhutan, south by Darjiling, and west by Nepal; area, about 2800 square miles. Sikkim is situated at a considerable elevation within the Himalayan mountain-

zone, and the passes into Tibet range from 13,000 to 16,000 feet above sea-level. The largest river is the Teesta, which, like the rest of the drainage, belongs to the basin of the Ganges. Little is known of the mineral resources of the country. The valleys and slopes are covered with dense jungle, and the vegetation varies, according to the elevation, from the cotton, banian, and fig in the lower zones, to the fir, rhododendron, and dwarf bamboo in the upper. The climate is unhealthy in the valleys, but salubrious above 4000 feet. The cultivated soil raises good crops of millet, maize, and rice. The aboriginal inhabitants are Lepchas, with marked Mongolian features and a language radically Tibetan. The capital is Tumlong. Pop. about 30,000.

Sikraul', western suburb of Benares city, India, containing the military cantonments, civil station, and European quarter.

Silchar', a town of India, chief town of Cachar dist., Assam, and a military cantonment, on a neck of land formed by a bend of the river Barak. Pop. 6567.

Sile'ne, a genus of plants belonging to the natural order Caryophyllaceæ. The species are in general herbaceous, many annual, very few shrubby. The stems and calyces of many of the species are viscous, hence the popular name *catch-fly*. They are mostly natives of South Europe and North Africa; eight are included in the British flora. Moss campion or stemless catch-fly (*S. acaulis*) is found on nearly all the Scotch mountains, and on the Devonshire and Cumberland hills. Its flowers are of a beautiful purple colour. Bladder campion (*S. inflata*) abounds in almost every field and wayside of Britain. It is about 1 foot high, and has white flowers, with an inflated calyx. The young shoots of this plant may be used like asparagus.

Sile'nus, a Grecian divinity, the foster-father and constant companion of Bacchus, and likewise leader of the satyrs. He was represented as a robust old man, generally in a state of intoxication, and riding on an ass carrying a cantharus or bottle.

Sile'sia (in German, *Schlesien*), a territory of Central Europe, now divided politically between Prussia and Austria. Prussian Silesia (15,556 square miles; pop. 4,112,219) is bounded east by Posen and Poland, south by the Austrian territories, west and north by Saxony and Brandenburg. The province is intersected by branches of the Sudetic Mountains in the south, but is level towards Brandenburg and Posen, and although in parts marshy and sandy, is yet fertile. The principal river is the Oder. Silesia produces corn, flax, madder, hemp, hops, tobacco, fruits, and tolerable wines. The mountainous parts yield timber and afford good pasturage and meadow land. Minerals include iron, copper, lead, silver, coal, sulphur, &c., and there are mineral waters in several places. Linen, cotton, and woollen goods, and leather are the chief manufactures. Silesia is divided into three governments—Breslau, Liegnitz, and Oppeln. Breslau is the capital. Silesia was annexed to Poland in the beginning of the 10th century. In 1163 it became independent, and was governed by three dukes of the royal house of Piast. At the beginning of the 14th century seventeen independent dukes reigned in Silesia at one time, and ruined the country by their feuds. In order to escape the grasp of Poland it acknowledged the sovereignty of the Bohemian kings. In 1675 the ducal line of Piast became extinct, and the country was incorporated in the Austrian dominions. In 1740 Frederick II. of Prussia laid claim to part of Silesia (based on old agreements to which effect had never been given), and in 1763, at the close of the Seven Years' war, great part of Silesia was ceded to Prussia. Austrian Silesia consists of that part of Silesia which was left to Austria; area, 1988 square miles. It is mountainous, and although the soil is not in all parts favourable, it is rendered productive by the industry of the inhabitants, who are also extensively engaged in linen, cotton, and woollen manufactures. Pop. 590,478.

Silex, same as *Silica* (which see).

Silhet, or SYLHET, chief town in the district of the same name, Assam, Hindustan, on the right bank of the Surmá. The houses of the Europeans are built on hillocks surrounded by fine spreading oaks, but the native quarter is overgrown with vegetation and intersected by open sewers. Pop. 14,407. —The district, area 5413 square miles, consists of a uniform level, intersected by a network of rivers and drainage channels. During the rainy season the western part of the district is submerged. The principal crop of the low grounds is rice. Pop. 1,969,009.

Silhouette (sil-ụ-et') is the representation of the outlines of an object filled in with black colour, in which the inner parts are sometimes indicated by lines of a lighter colour, and shadows or extreme depths by the aid of a heightening of gum or other shining

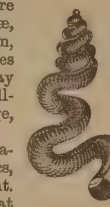
medium. The name comes from Étienne de Silhouette, French minister of finance in 1759, in derision of his economical attempts to reform the financial state of France while minister. During this period all the fashions in Paris took the character of parsimony, and were called *à la Silhouette*. The name has only remained in the case of these drawings.

Sil'ica ($Si O_2$), a compound of oxygen and silicon, forming one of the most frequently occurring substances in the materials of which this globe is composed. Silica forms a principal ingredient in nearly all the earthy minerals, and occurs either in a crystallized form or in amorphous masses. In its naturally crystallized form it is known as *rock-crystal*. Coloured of a delicate purple these crystals are known as *amethyst*, and when of a brown colour, as *Cairngorm-stone*. Silica is also met with in the form of *chalcedony* and *carnelian*. It enters largely into the lapidary's art, and we find it constituting jasper, agate, cat's-eye, onyx, and opal. In opal the silica is combined with water. The resistance offered by silica to all impressions is exemplified in the case of *flint*, which consists essentially of silica coloured with some impurity. Silica is found to constitute the great bulk of the soil which serves as a support and food of land plants, and it enters largely into the composition of many rocks. Many natural waters present us with silica in a dissolved state. It is, however, not soluble in pure water. The action of an alkali is required to bring it into a soluble form. Silica forms a number of hydrates, which have acid properties, and from which a vast number of salts known as silicates are obtained.

Silicate Paint, natural silica, when dried and forming an almost impalpable powder, mixed with colours and oil. Unlike the ordinary lead paints, all the silicate colours are non-poisonous. Silicate white has great covering power; it is not affected by gases; and heat of 500° is successfully resisted.

Sil'icon, the non-metallic element of which silica is the oxide; chemical symbol, Si; atomic weight, 28. It may be obtained amorphous or crystalline. In the latter form (adamantine silicon) it is very hard, dark-brown, lustrous, and not readily oxidized. It unites with hydrogen, chlorine, &c., to form well-marked compounds.

Sil'iqua, in botany, a kind of seed-vessel, such as the long pod-like fruit of crucifers. It is characterized by dehiscing by two valves which separate from a central portion called the *replum*. It is linear in form, and is always superior to the calyx and corolla. The seeds are attached to two placentæ, which adhere to the replum, and are opposite to the lobes of the stigma. Examples may be seen in the stock or wall-flower, and in the cabbage, turnip, and mustard.



Siliquaria anguina.

Siliqua'ria, a genus of marine gasteropodous molluscs, found both fossil and recent. The shell is tubular, spiral at its beginning, continued in an irregular form, divided laterally through its whole length by a narrow slit, and formed into chambers by entire septa.

Silis'tria, a town of Bulgaria, on the right bank of the Danube, 66 miles north by east of Shumla. It was an ill-built and dirty town until the war with Russia in 1853–56, but after that time it was considerably improved. Silistria was strongly fortified up to 1878, when the fortifications had to be dismantled in accordance with the terms of the Berlin Treaty. In May and June 1854, with a garrison of 15,000, it successfully resisted a siege of thirty-nine days by 60,000 to 80,000 Russians. Pop. 10,642.

Sil'ius, CAIUS, surnamed *Italicus*, a celebrated orator and advocate at Rome, born in the reign of Tiberius, about the year 25 A.D. He was consul at the time of Nero's death, and proconsul of Asia under Vespasian. Being seized with an incurable ulcer, he starved himself to death in his seventy-fifth year. The only work of Silius which has reached modern times is an epic poem on the second Punic war.

Silk, the peculiar glossy thread spun by the caterpillars or larvæ of certain species of moths, and a well-known kind of fabric manufactured from it. The chief silk-producing larvæ belong to the family of the Bombycidæ, of which group the common silk-moth (*Bombyx mori*) is the most familiar species, being that which is by far the most important in artificial culture. This family of moths is distinguished by the small size of the proboscis, by the thick hairy body; and by the large, broad wings. The common silk-moth possesses a short body, stout legs, and white wings, which are marked by black lines running parallel with the wing borders. The female moth deposits

her eggs in summer on the leaves of the mulberry-tree (*Morus alba*). For hatching artificially the eggs are placed in a room heated gradually up to a temperature of about 80° Fahr. In eight or ten days the young appear. The caterpillars are then covered with sheets of paper on which mulberry leaves are spread, and make their

Silk-worm—Larva, Chrysalis, and Cocoon.

way through perforations in the paper to the mulberry leaves, their natural food. The leaves when covered with caterpillars are laid on shelves of wicker-work covered with brown paper. When first hatched the larvæ or worms are black and about ¼ inch long. The larval or caterpillar stage lasts from six to eight weeks, and during this period the insect generally casts its skin four times. After casting its last skin the insect is about 2 inches long, and in ten days attains its full growth of 3 inches. The insect's body consists of twelve apparent segments, with six anterior fore-legs, and ten fleshy legs or 'prolegs' provided with hooks in the hinder body-segments. The mouth is large, with powerful jaws. At this stage the insect becomes languid, refuses food, and prepares for its next change into the pupa or chrysalis stage. Oak, broom, or other twigs are now laid on the wicker frames, and the worms crawl into these, where they spin their cocoon by winding a self-produced silk thread many times round their body. This silky thread is formed from a glutinous secretion contained in two tubular glands on either side of the body, opening on the lower lip of the larva in a prominent aperture called the *spinneret*. This secretion becomes tenacious and thread-like when brought in contact with the air, and the two filaments unite as they issue from the spinneret, apparently by the glutinous secretion of another and special gland. The spinning of the pupa-case or cocoon lasts from three to five days. After passing about three weeks in the nymph or chrysalis stage, the larval form emerges from the cocoon as the perfect moth or *imago*. But those insects destined to afford the silk material are not allowed to enter the *imago* stage. The completed cocoon with its contained larva is thrown into warm water, which dissolves the glutinous matter cementing the threads together, and facilitates the unwinding of the silk. The average length of a thread furnished by a single cocoon is 300 yards. About 12 lbs. of cocoons yield 1 lb. of raw silk, and 1 oz. of silk-worms' eggs will give 100 lbs. of cocoons. The female moth produces from 300 to 500 eggs.

For the perfect and successful cultivation of the silk-worm, vigorous and healthy mulberry-trees are necessary. The favourite European species is *Morus alba* or white mulberry. Other noted species are *M. alpina*, *M. Moretti*, and *M. japonica*, the latter introduced from Japan. Among the most destructive diseases of the silk-moth's eggs and larvæ are those known by the names of *muscardine* and *pébrine*. The latter disease created great ravages in France for some years, and ruined many cultivators, but latterly has been successfully combated.

In Europe some moths produce one generation, others two generations annually; but the caterpillars from the former class produce the best silk. In India some forms produce eggs monthly, while three or four generations annually are not uncommon in that country. A valued variety of the *Bombyx mori* is the Novi race of Italy, which spins a large white oval cocoon. The Japanese race produces a cocoon having a divided appearance in the centre. The *Bombyx Yama-mai*, or Japanese oak-feeding silk-moth, produces a green cocoon, the silk of which is much used for embroidery. *B. Peryini* inhabits N. China and is also an oak-feeder. Its cocoon is large and grayish-brown in colour. The *B. Cynthia* of China and North Asia manufactures a gray cocoon, from which the Chinese manufacture a silk recognized by its soft texture. From the cocoon of the *Antheræa Paphia* of India, or '*tussur* moth,' the natives manufacture the Tussur silk fabric. *Bombyx textor* of Bengal makes a pure white silk used by the natives. There are several other varieties of silk-producing moths, but they are less notable and commercially unimportant.

The Chinese appear to have been the first to render the filamentous cocoon substance

serviceable to man, and China is still the chief silk-producing country in the world. Before the reign of Augustus the use of silk was little known in Europe, and the culture of the silk-worm was not introduced until the 6th century. It was at first confined to Constantinople, but soon spread to Greece, and then through Italy to Spain. When the Duke of Parma took Antwerp in 1585 a check was put on its trade in silk goods, and many of the weavers from Flanders and Brabant took refuge in England. In 1685 the Edict of Nantes drove hosts of silk workers into exile, as many as 50,000 having settled in Spitalfields, London. A silk-throwing machine, constructed on Italian models secretly obtained, was fitted up at Derby in 1714 by Thomas Lombe (afterwards Sir Thomas Lombe), who obtained a patent in 1719, and on its expiration received a grant of £14,000 for his services to his country. In France looms were set up at Lyons in 1450, and at Tours in 1470. The first nursery of white mulberry-trees was founded by a working gardener of Nismes, who ultimately propagated them in many districts in the south of France. Italy is now the chief silk-producing country in Europe, France coming next.

In the manufacture of silk the first operation is the unwinding of the cocoons and the *reeling* of the silk. For this purpose they are placed in shallow vessels containing hot water, which softens the gummy matter of the cocoons. The ends of the filaments are then conducted by guides to large reels moved by machinery. Four or five (or more) threads from as many different cocoons are thus brought together, and uniting by the gum form one thread. When the cocoon is half unwound the filament decreases 50 per cent in thickness. The silk thus produced is called *raw silk*. Before it can be woven into cloth the raw silk must be *thrown*. This is often a special trade, and is usually conducted by machinery in large mills. Previous to *throwing*, the silk is carefully washed, wound on bobbins, and assorted as to its quality. In the throwing-machine it is again unwound from the bobbins, twisted by the revolutions of a flyer, and then wound on a reel. The twist of the silk is regulated as required by varying the relative velocities of the flyer and reel. The silk thus prepared is called *singles*, and is used for weaving common or plain silks and ribbons. The next operation, called *doubling*, is the twisting of two or more of these threads on one bobbin. This is done in a throwing-machine, and the silk thus spun is called *tram* silk, commonly used for the weft of richer silks and velvets. Two or more of these threads of tram-silk twisted in the throwing-mill together constitute *organzine*, a species of silk thread used for warps of fine fabrics. But in tram-silk the threads are all twisted in one direction, forming individual strands like twine, whereas in organzine the collected threads are twisted in an opposite direction to the twist of the strands, like cable or rope. The silk in this condition is called *hard* in consequence of the gum, which is, however, separated by careful boiling. The throwing-machine has been greatly improved both as to accuracy and produce by assimilating it to the cotton throstle. The manufacture of *waste* silk is quite different from that just described, being more akin to that of wool or cotton. Waste silk consists of the floss-silk or outer fibres of the cocoons; of the silk of defective cocoons, such as those from which the moths have been allowed to issue; of the remains of cocoons from which the fibre has been mostly reeled, &c. Until about 1857 this waste was entirely useless, but is now the object of an important industry, being cleared of the gum by boiling, and subjected to such processes as breaking, combing, drawing, and roving, till it is ready for spinning. In the manufacture of silk fabrics France holds the leading place in Europe, Lyons being the chief seat of the trade. In Britain silk fabrics are manufactured at Coventry, Macclesfield, Derby, Spitalfields in London, Manchester, Nottingham, and in Ayrshire, Scotland. Owing to the protective policy of the American government the manufacture of silk in the United States has attained considerable dimensions.

Silk-cotton Tree (*Bombax ceiba*), a tree belonging to the natural order Sterculiaceæ, indigenous to the West Indies and South America. It has a reddish and prickly stem and palmated leaves. The flowers change from white to red, and the wood is soft and spongy. The down which is contained in the seed capsule is used for stuffing pillows, chairs, sofas, &c. Canoes are constructed from the timber.

Silk-worm. See *Silk*.

Silkworm-gut, a substance prepared from the silky secretion of the caterpillars of the ordinary silk-worm taken from the insects' body, and constituting the lustrous and strong line so well known to anglers under the name of 'gut.'

Silliman, Benjamin, M.D., LL.D., an American physicist, was born in North Stratford (now Trumbull), Connecticut, 1779; died 1864. He was admitted to the bar in 1802, but in the same year abandoned law to take up a professorship of chemistry at Yale College. After studying under Dr. Woodhouse at Philadelphia, he delivered his first course of lectures at Yale in the winter of 1804–5. He then spent fourteen months in England, Scotland, and Holland to prosecute further his studies in physical science. Shortly after his return he made a geological survey of a part of Connecticut. In 1818 he founded the American Journal of Science and Arts, of which he was sole editor for twenty years. He made a second visit to Europe in 1851, and in 1855 gave his last course of lectures at Yale.—His son, Benjamin (1816–85), was assistant and successor to his father both as professor and editor. He wrote works on chemistry and physics, and many papers on scientific subjects.

Silloth, a modern seaport and watering-place of England, in the county of Cumberland, on the coast of the Solway Firth, 18 miles west of Carlisle. It is the port of Carlisle, and is much frequented as a health resort. Pop. 2116.

Silos. See *Ensilage.*

Sil'phidæ, a family of beetles which subsist upon putrefying substances. See *Burying-beetle.*

Silu'res, an ancient British tribe which inhabited the district included in the modern counties of Hereford, Radnor, Brecknock, Monmouth, and Glamorgan. They were of the earlier Celtic stock, and were amongst the most warlike of the British tribes. They were subdued by the Romans about 78 A.D.

Silurian System. See *Geology.*

Siluridæ. See *Silurus.*

Silu'rus, a genus of fishes of the family Siluridæ, order Physostomi. This genus, of which five species are known, inhabits the temperate parts of Europe and Asia. The head and body are covered with soft skin, and the jaws have four or six barbels. The only species which occurs in Europe is sly silurus or sheat-fish (*Silurus glanis*), found in the fresh waters east of the Rhine. It attains to a weight of 300 or 400 lbs., and the flesh is firm and well flavoured. The family Siluridæ (otherwise named sheat-fishes) constitutes a very extensive section of fishes, the species of which are, for the most part, confined to the fresh waters of warm climates. They present great diversity of form, but their most obvious external characters are the want of true scales. The

Sly Silurus (*Silurus glanis*).

mouth is almost always provided with barbules.

Silvas. See *Selvas.*

Silver, one of the best-known metals. It appears to have been known almost as early as gold, and, without doubt, for the same reason, because it occurs very frequently in a state of purity in the earth, and requires but an ordinary heat for its fusion. Pure silver is of a fine white colour. It is softer than copper but harder than gold. When melted its specific gravity is 10·47; when hammered, 10·510. Its chemical symbol is Ag. It is next in malleability to gold, having been beaten into leaves only $\frac{1}{1000}$th of an inch in thickness. It may be drawn out into a wire much finer than a human hair, and a wire of silver 0·078 of an inch in diameter is capable of supporting a weight of 187·13 lbs. avoirdupois. It excels all other metals as a conductor of heat and electricity. Silver melts when heated completely red-hot, and may be boiled and volatilized by a very strong and long-continued heat. It is rapidly volatilized when heated on charcoal by the flame of the compound blow-pipe. When cooled slowly crystals of silver may be obtained. Silver is not oxidized by exposure to the air, neither is it affected by water, but it is blackened or tarnished by sulphuretted hydrogen. The atomic weight of silver is 108. *Oxide of silver* (Ag_2O_3) is produced by dissolving silver in a solution of nitric acid and precipitating with an alkali. Its specific gravity is 7·14. The compound called *horn silver* or *chloride of silver* (Ag Cl) is obtained by dissolving silver in nitric acid and mixing the solution with a solution of common salt. Its specific gravity is 5·550. When exposed to the light it turns to a blackish colour, hence its great use in photography. *Bromide of silver* is the most sensitive to light of any known solid. It is used for coating the

'dry-plates' employed in photography. When silver is long exposed to the air it acquires a covering of a violet colour, which deprives it of its lustre; this coating is sulphide of silver. Sulphide of silver occurs native as *silver-glance*. Silver readily forms alloys with iron, steel, lead, tin, and mercury. Of the combinations of acid and silver the most important is *nitrate of silver* ($AgNO_3$), obtained by dissolving silver in nitric acid. If the silver and acid are pure the solution of silver nitrate is colourless, very heavy, and caustic; it stains the skin, and all animal substances, of an indelible black; after evaporation it deposits, on cooling, transparent crystals of nitrate of silver (which see).

There are five important silver ores, viz. native silver, vitreous silver (or silver-glance), black silver, red silver, and horn silver. The first is usually found in dentiform, filiform, and capillary shapes, also in plates formed in fissures and in superficial coatings; lustre metallic; colour silver-white, more or less subject to tarnish; ductile; hardness between gypsum and calcareous spar; specific gravity, 10·47. Native silver occurs principally in veins, traversing gneiss, clay-slate, and other palæozoic rocks, but not usually in great quantity. It often forms a natural alloy with gold. Vitreous silver presents itself in various shapes, and is of a blackish lead-gray colour with a metallic lustre. It is malleable, about as hard as gypsum, and subject to tarnish; specific gravity, 7·19. It is more or less pure silver sulphide, and has been found almost exclusively in veins along with ores of lead, antimony, and zinc. It occurs in Saxony, Bohemia, Hungary, Mexico, and Peru; and is an important species for the extraction of silver. Black silver generally occurs in granular masses of an iron-black colour. It is sectile and about as hard as gypsum; specific gravity, 6·2. This mineral is a composition of silver (about 68·5 per cent) with antimony and sulphur and traces of iron, copper, and arsenic. It is found in veins along with other ores of silver, and is a valuable ore for the extraction of silver. It occurs chiefly in Saxony, Bohemia, Hungary, and the American continent. Red silver is found in crystals and often massive, granular, and even as an impalpable powder. It is a double sulphide of silver and antimony, containing on an average 60 per cent of silver. It occurs in veins with other silver ores, galena, and blende. It is found in various parts of Saxony, also in Bohemia, Hungary, and Norway; but chiefly in Mexico, Peru, and the Western States of America. Horn silver, or silver chloride, occurs in crystals and also in crusts and granular masses. It contains about 76 per cent of silver. It is found in the upper parts of veins in clay-slate, and also in beds with other silver ores or with iron-ochre. It is not abundant in Europe, but occurs in large masses in Mexico and Peru. The above are the ores of silver from which silver is chiefly extracted; but argentiferous sulphides of lead and copper are also smelted for the small proportion of silver they contain.

Silver is extracted from its various ores by *smelting* or *amalgamation*. The former method is founded on the great affinity of silver for lead, which, when fused with silver, acts as a solvent and extracts it from its union with baser metals. The silver is afterwards separated from the lead by the process of cupellation (see *Assaying*), which consists in exposing the melted alloy to a stream of atmospheric air, by which the lead is converted into an oxide (litharge) while the silver remains untouched. The latter method depends upon the property of mercury to dissolve silver without the aid of heat. The first is called the *dry*, the last the *wet* way of treating silver ores. One or the other process is employed according to the nature of the ores. The ores which are treated in the dry way are usually those consisting principally of argentiferous sulphide of lead. By this method the ore is first pulverized and roasted to expel the sulphur, and is then freed from the lead. The ores best adapted to the process of amalgamation are native silver and vitreous silver. The ores are first selected to form a proper mixture with reference to the quantity of silver and sulphur they contain. The sulphur is then got rid of by adding to the mixture of an ore 10 per cent of common salt, by which, during the furnace operation, the sulphur is oxidized, and the acid thus formed unites with the base of the salt and forms sulphate of soda; whilst the hydrochloric acid thus set free combines with the silver in the ore that was not in the metallic state, and forms chloride of silver. In this state the ore is reduced to an impalpable powder by various mechanical processes. It is then submitted to the action of mercury, with which it forms what is called an *amalgam*. This amalgam is subjected to the action of heat in a distilling furnace, by which the mercury is

sublimed, and the silver remains. Silver is sometimes separated from copper by the process of *eliquation*. This is effected by means of lead, which when brought into fusion with the alloy combines with the silver. The argentiferous lead thus obtained is subjected to the usual processes of cupellation, and the coarse copper from which the silver has been separated is refined. Large quantities of silver are now obtained from argentiferous lead ores by a process known as Pattinson's process, which depends on the property pure lead possesses of crystallizing at a temperature at which an alloy of silver and lead is still fluid, so that the solid crystals of lead can thus be removed.

The silver mines of North and South America are incomparably more important than those of all the rest of the world. The Mexican mines were worked before the Spanish conquest, and then produced large quantities of silver. Up to the present time their total yield has been estimated at between £600,000,000 and £700,000,000. Great deposits of silver have been discovered in the Western States of America, particularly in Nevada, Arizona, California, Colorado, Idaho, Montana, New Mexico, and Utah, and the yield amounts to about £10,000,000 annually. Silver ore, chiefly argentiferous galena, has also been found in great quantities in the Barrier Ranges of New South Wales. Some of the mining concerns here are the largest in the world. Considerable quantities of silver are also produced in Europe. The average production of Germany is estimated at about £1,600,000. In Britain silver is obtained from argentiferous lead ore to the value of over £30,000 annually. The world's total production of silver at present is about £25,000,000 to £28,000,000 annually. The value per ounce has been as low as 29*d*.

Silver-fir, a species of fir, the *Abies picea* or *Picea pectinata*, so called from two silvery lines on the under side of the leaves. It is a native of the mountains of the middle and south of Europe, but has long been common in Britain. It grows to the height of 150 to 180 feet, forming a very fine tree. Its timber is not so much prized as that of some other species, but is used for various purposes, and is durable under water. It yields resin, turpentine, tar, &c., especially the fine clear turpentine known as Strasburg turpentine. The American silver-fir, the balm of Gilead fir (*Abies balsamea*), yields the Canada-balsam used for optical purposes. Other species of *Picea* are also called silver-firs.

Silver-fish, a fish of the size of a small carp, having a white colour striped with silvery lines. It is a variety of the *Cyprinus aurātus*, or gold-fish.

Silver-fox, a species of fox, *Vulpes argentātus*, inhabiting the northern parts of Asia, Europe, and America, and distinguished by its rich and valuable fur, which is of a shining black colour, having a small quantity of white mixed with it in different proportions.

Silvering, the application of silver leaf is made in the same way as that of gold, for which see *Gilding*. Several mixtures containing silver have long been in use for coating base metallic objects, but they have been almost all superseded by the modern process of electro-plating. (See *Electro-metallurgy*.) For a description of the silvering of mirrors see the article *Mirror*.

Silverton, a municipality of New South Wales, dating from 1886; the centre of the Barrier Ranges silver-mining district. It is situated on the Umberumberka Creek about 18 miles from the border of South Australia, and 822 miles west of Sydney. There are rich silver-mines 17 miles south-east of Silverton, especially those of Broken Hill, where a town of some 20,000 inhabitants has recently sprung up.

Simaruba'ceæ, a natural order of trees and shrubs, all having an intensely bitter bark, a milky juice, and pinnate leaves. The typical genus is *Simarūba*. See *Bitter-ash, Quassia*.

Simbirsk', an eastern government of Russia; area, 29,657 square miles. It consists in general of an extensive fertile plain watered by the Volga and its affluents. Agriculture and cattle-breeding are the leading industries. The principal crops are grain, hemp, flax, hay, and tobacco. Minerals are unimportant. There is an abundance of fish in the rivers and numerous small lakes. Pop. 1,481,811.—SIMBIRSK, the capital, stands on a lofty bank of the Volga, 448 miles E.S.E. of Moscow. It has wide streets and squares, a cathedral, &c. There is an annual fair, and a good trade in corn and fish. Pop. 36,600.

Simcoe Lake, a lake of Ontario, Canada, between Lake Ontario and Georgian Bay, an arm of Lake Huron. It is about 30 miles long and 18 miles wide, and discharges itself into Lake Huron by the river Severn. Its banks are well wooded, and it contains several islands.

Simeon, Tribe of, the descendants of Simeon, the second of Jacob's sons by Leah. They received a section in the south-west of Canaan, which was originally allotted to Judah.

Simeon Stylites. See *Stylites.*

Simfero'pol, a town of Russia, capital of the government of Taurida, in the south of the Crimea. The old town is poorly built, and occupied chiefly by Tartars; the new town has spacious streets and squares. Pop. 36,503.

Sim'ia, the generic name applied by Linnæus to all the monkeys, now the genus which includes the orang.

Sim'iadæ, a quadrumanous family of mammals now limited to include the higher apes, such as the orang, gorilla, and chimpanzee.

Simla, a town of British India, in the

View of part of Simla.

Punjab, chief sanitarium and summer capital of British India, is situated 78 miles N.N.E. of Umballa. It stands 7084 feet above sea-level, on a transverse spur of the Central Himálayas, and consists of scattered bungalows and other buildings, which extend for about 6 miles along the heights, among woods of *deodar*, oak, and rhododendron. Simla contains many fine public buildings, including the viceregal lodge, government buildings, a town-hall, hospital, dispensary, and many schools. A brisk export trade exists in opium, fruits, nuts, and shawl-wool. Its average temperature is about 62°, and its summer heat seldom exceeds 72°. Pop. 13,258, considerably augmented during the season.

Simla Hill States, a collection of twenty-three Indian native states surrounding the sanitarium of Simla; total area, 6569 square miles. The mountains of these states form a continuous series of ranges ascending from the low hills of Ambála (Umballa) to the great central chain of the Eastern Himálayas. The chief river is the Sutlej. The climate is genial, and the winters comparatively mild. Pop. 502,853.

Simms, William Gilmore, American author, born at Charleston, South Carolina, 1806; died 1870. He was for some time clerk in a drug house at Charleston, afterwards studied law, and was admitted to the bar in 1827, but abandoned that profession for literature and journalism. He published in 1827 a volume of poems; but his best poem, Atalantis, a Tale of the Sea, appeared in 1833. This was followed by a series of romances founded on revolutionary incidents in South Carolina, and by several border tales and historical romances. Amongst these we may mention Martin Faber (1833), Guy Rivers (1834), The Yemassee (1835), The Partisan (1835), Pelayo (1838), The Damsel of Darien (1839), The Kinsman (1841, sub-

sequently called The Scout), Count Julian (1845), Eutaw (1856), The Cacique of Kiawah (1859). His other works include: Southern Passages and Pictures, a series of poems (1839); History of South Carolina (1840); The City of the Silent, a poem (1851); and South Carolina in the Revolution (1854). He was editorally connected with several periodicals, and filled several political offices.

Simnel, LAMBERT, an impostor who was put forward by a party of malcontent leaders of the York faction early in the reign of Henry VII. He was trained to personate Edward Plantagenet, earl of Warwick, son of the murdered Duke of Clarence. Simnel was crowned at Dublin, and landed with his followers in Lancashire. They were totally defeated near Newark, 16th June, 1487, when most of the leaders in the rebellion perished. Simnel ended his days as a domestic in the royal service.

Sim'ois, a river adjacent to Troy, celebrated by Homer.

Simon (sē-mōn), JULES (properly JULES FRANÇOIS SUISSE SIMON), a French philosopher and statesman, born at Lorient, department of Morbihan, 31st Dec. 1814, and educated in the École Normale, Paris. In 1839 he succeeded Cousin as professor of philosophy in the Sorbonne, but lost this post in 1852 by refusing to take the oath of allegiance to Napoleon III. In 1855–56 he delivered a series of philosophical lectures in several towns of Belgium, and in 1863 was returned to the Chamber of Deputies. He strongly opposed the war with Prussia, and after the revolution of the 4th Sept. 1870 he became a member of the provisional government, and was minister of education under Thiers from 1871 to 1873. In 1875 he was elected to the senate, and at the same time member of the Academy. In 1876 he became leader of the Republicans, and was minister of the interior until 16th May 1877, when he was dismissed by MacMahon. He afterwards edited the Echo Universel. His chief works include Histoire de l'École d'Alexandrie (1844), Le Devoir (1854), La Liberté de Conscience (1859), L'Ouvrière (1863), L'École (1864), Le Travail (1866), La Peine de Mort (1869), Souvenirs du 4 Septembre (1873), and Le Gouvernement de M. Thiers (two vols. 1878). He died in 1896.

Simon'ides (-dēz), a Greek lyric poet, born in the island of Ceos about B.C. 556. He visited Athens, and after the death of Hipparchus, who had treated him very generously, he proceeded to Thessaly, where he obtained the patronage of powerful families. He subsequently returned to Athens, and at a competition for the best elegy upon those who fell on the field of Marathon, gained the prize over Æschylus himself. When eighty years of age he was victorious in another celebrated poetical contest, which was his fifty-sixth victory of this nature. Shortly after this he was invited to the court of Hiero at Syracuse, where he remained till his death in 467 B.C. at the advanced age of ninety. Simonides is credited with the addition to the Greek alphabet of the long vowels and the double letters. Only fragments of the works of this poet have come down to us.

Simon Magus (that is, the *Magician*), an impostor mentioned in the Acts of the Apostles, a native of Samaria. According to tradition he went to Egypt, where he studied heathen philosophy and magic. On his return he exhibited his acquired arts as a proof of his divinity. He made many proselytes, and it is said that he was worshipped as a god at Rome. His name has given rise to the term *Simony* (which see). He is regarded as one of the early Gnostics.

Simonose'ki, or SHIMONOSEKI, a port and town of Japan, on the south-west point of the Island of Hondo. It is an important depôt station for the transmission of European imports from Nagasaki to the interior, and for the return traffic. Pop. 19,532.

Simon's Town, a port on the west coast of False Bay, Cape Colony, 25 miles S.E. of Cape Town. (See map at art. *Cape of Good Hope.*) It has a large arsenal, dockyards, a military and naval hospital, and extensive defensive works. Pop. 3572.

Si'mony, originally meant the sin of buying and selling spiritual gifts, and was so called from Simon Magus, who attempted to buy the gift of the Holy Spirit from the apostles. In English law it is the crime of trafficking with sacred things, particularly the corrupt presentation of anyone to an ecclesiastical benefice for money or reward. This offence is not punishable in a criminal way at common law, but by an act of Queen Elizabeth it is provided that a corrupt presentation is void, and that the presentation shall go to the crown.

Simoom', a hot suffocating wind that blows occasionally in Africa and Arabia, generated by the extreme heat of the parched deserts or sandy plains. The air, heated by contact

with the noonday burning sand, ascends, and the influx of colder air from all sides forms a whirlwind or miniature cyclone, which is borne across the desert laden with sand and dust. Its intense, dry, parching heat, combined with the cloud of dust and sand which it carries with it, has a very destructive effect upon both vegetable and animal life. The effects of the simoom are felt in neighbouring regions, where winds owing their origin to it are known under different names, and it is subject to important modifications by the nature of the earth's surface over which it passes. It is called *Sirocco* in South Italy, *Kamsin* in Egypt and Syria, and *Harmattan* in Guinea and Senegambia.

Simplon (saṇ-plōṇ; Italian *Sempione*), a mountain, 11,117 feet high, belonging to the Alps, in the canton of Valais, Switzerland, and celebrated for the road that passes over it, which commences near Brieg, on the Swiss side, and terminates at the town of Domo d'Ossola, in Piedmont. Begun in 1800 under the direction of Napoleon, it was completed in 1806. It is carried across 611 bridges and through a number of great tunnels, and rises to the height of 6578 feet. A scheme is projected to make a railway tunnel through the Simplon in order to connect the lines from Geneva to Brieg, and from Domo d'Ossola to the Lago Maggiore. The estimated length of the tunnel is 12½ miles, and the cost about £4,000,000.

Simpson, Sir James Young, M.D., the most eminent medical practitioner of his day, and the discoverer of the anæsthetic properties of chloroform, was born in 1811 at Bathgate in Linlithgowshire, died at Edinburgh 1870. At the age of fifteen he proceeded to Edinburgh University, and in 1830 was licensed by the Royal College of Surgeons. In 1832 he graduated as M.D., and became assistant to Professor John Thomson. He was shortly afterwards elected one of the presidents of the Royal Medical Society, and in 1835 he published a paper on Diseases of the Placenta, which was translated into different European languages. In 1839 he was appointed to the chair of midwifery in the University of Edinburgh. His first paper on chloroform was read before the Medico-Chirurgical Society of Edinburgh on March 10, 1847, and it soon came into general use. He received honours from numerous scientific societies in Europe and America, and in 1853 was elected a foreign associate of the Academy of Medicine of Paris. In 1856 he received the laureateship and gold medal of the French Academy of Sciences, with the Monthyon prize of 2000 francs awarded for 'most important services done to humanity.' He first expounded acupressure in a paper read before the Royal Society of Edinburgh in 1859, and afterwards in his treatise on Acupressure (1864). For twenty years he devoted himself to the subject of hospital reform, and in his leisure found time to engage in antiquarian research. In 1847 he was appointed her majesty's physician-accoucheur for Scotland; in 1856 he was made a knight of the royal order of St. Olaf of Sweden; and in 1866 a baronetcy was conferred on him.

Simrock, Karl, German writer, born at Bonn in 1802, studied there and at Berlin, entered the civil service of Prussia at Berlin, was dismissed in 1830 on account of expressing sympathy with the French July revolution; settled at Bonn and devoted himself to literature; was appointed professor of the Old German language and literature in 1850, and died there in 1876. Besides writing original poetry, he translated into modern German verse some of the most important of the old German poems, including the Nibelungenlied, Reineke Fuchs, &c., and altogether rendered great service to the study of the German language and literature.

Sims, George Robert, journalist and dramatic writer, born 1847. He became a contributor to Fun under the pen name of 'Dagonet,' and has written much on the London slums. His most successful dramas are The Lights o' London, The Romany Rye, and in collaboration The Harbour Lights, In the Ranks, and London Day by Day. He has also written novels, &c.

Sims, James Marion, American surgeon, born in South Carolina 1813, died in New York 1883. He studied medicine at Charleston and Philadelphia, and having begun practice had his attention specially drawn to some of the special diseases of women, for which he gained a distinguished name, introducing new instruments and operations. He was instrumental in getting a woman's hospital established in New York; subsequently practised for some years in Europe; and had charge of a large hospital at Sedan after the disaster to the French there in 1870.

Simson, Robert, Scottish mathematician, was born in Ayrshire 1687, died 1768. He

was educated at the University of Glasgow with a view to the church, but relinquished theology for mathematics. In 1711 he was elected to the mathematical chair in Glasgow University, and continued to discharge the duties of his class for the remainder of his life. He directed his private studies to the restoration of the ancient geometers, and produced an edition of Euclid which has been frequently republished.

Sinai (sī'nā), properly the general name of a mountain mass in Arabia Petræa, in the south of the peninsula of the same name, which projects into the Red Sea between the gulfs of Akaba and Suez. Sometimes the name is confined to the culminating mountain of the mass, which rises 8551 feet above sea-level. The whole mass is of a triangular shape, about 70 miles long from north to south, and consists of a series of mountains, composed for the most part of granite, syenite, and porphyry, with occasional strata of sandstone and limestone, and intersected by numerous *wadis* or valleys. The principal peaks of the mass are Jebel Zebir, 8551 feet; Jebel Katerin, 8536 feet; Jebel Umm Shomer, 8449 feet; Jebel Músá, 7375 feet; and Jebel Serbál, 6734 feet. From the time of Justinian downwards Jebel Músá, or Mount of Moses, has been almost universally regarded as the mountain of the law.

Sinait'ic Codex (sī-na-it'ik), a Biblical MS. written on vellum, and containing a large portion of the Septuagint, with the apocryphal books, the whole of the Greek New Testament, with the epistle of Barnabas and a fragment of the Shepherd of Hermas. It was discovered in a convent at Mount Sinai by Tischendorf (which see) in 1844–59, and at his suggestion presented to Alexander II. of Russia, who caused it to be published in 1862. It probably dates from the 4th century.

Sinalo'a, or CINALOA, a state of Mexico, bordering on the Bay of California; area, 22,630 square miles. The western portion of the state is sandy and barren, but the centre is very fertile. The eastern division is traversed by the Mexican Cordilleras. In the fertile districts vegetation is luxuriant, the chief products being sugar, tobacco, cotton, figs, pomegranates, &c. The inhabitants are chiefly engaged in cattle-rearing and mining. Pop. 201,918.—The chief town is CULIACAN. Pop. 7878.

Sina'pis. See *Mustard.*

Sin'apism, a mustard poultice.

Sinclair (sing'klar), originally ST. CLAIR, a Scottish family of Norman origin, founded by William de Santo Claro, who settled in Scotland, and received from David I. the grant of the barony of Roslin. The earldoms of Orkney, of Caithness, and of Rosslyn have been specially connected with this family, which at one time was one of the most powerful in the kingdom.

Sinclair, CATHERINE, daughter of Sir John Sinclair (see below), born 1800, died 1864. She published numerous tales, novels, and books for children, &c., which had an extensive circulation.

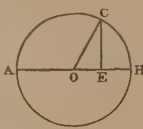
Sinclair, SIR JOHN, Bart., agriculturist and general statist, eldest son of George Sinclair of Ulbster, and Janet, daughter of Lord Strathnaver, was born at Thurso Castle, Caithness, May 10, 1754, and educated at the Universities of Edinburgh, Glasgow, and Oxford. He was called to both the Scottish and English bars, but did not follow the profession of law. He was returned to parliament as member for Caithness in 1780, and also at the elections of 1790, 1802, and 1807. In 1786 he was created a baronet. He had already seriously engaged in inquiries on political subjects, and in 1790 he conceived the idea of that great national undertaking, the Statistical Account of Scotland, a statistical and descriptive account of the whole country, parish by parish. After unwearied exertions, in which he was ably seconded by the clergy (by whom much of the work was done), Sir John succeeded in publishing the first volume on the 25th May, 1791, and on the 1st January, 1798, the work was completed. In 1793 Sir John advocated and obtained the establishment of a board of agricultural and internal improvement, of which he became president. In 1803 he published a History of the Public Revenue of the British Empire, and also a pamphlet on Longevity. The latter subject was afterwards treated more fully in his Code of Health and Longevity. This was followed in 1819 by his Code of Agriculture, a work which went through several editions and translations. Sir John died in Edinburgh in 1835.

Sind, SINDH, or SCINDE, a province of British India, in the northern part of the presidency of Bombay. It consists of the lower valley and delta of the Indus, and is bounded on the west and north-west by Baluchistan and Afghanistan; north-east by the Punjab; east by Rajputana; and

south by the Runn or Ran of Kach and the Indian Ocean; area, 48,014 square miles. It is divided into five districts, Haidarabad, Karáchi, Shikarpur, Thar and Parkar, and Upper Sind Frontier, and also includes the native state of Khairpur (6109 sq. miles). The chief city and port is Kurrachee or Karáchi, but the ancient capital Haidarabad is still a populous town. Flatness and monotony are the great features of Sind. The only elevations deserving the name of mountains occur in the Kirthar range separating Sind from Baluchistan. The plain country comprises a mixed tract of dry desert and alluvial plain. The finest and most productive region lies in the neighbourhood of Shikarpur, where a narrow island 100 miles long is inclosed on one side by the River Indus and on the other by the Western Nára. Another great alluvial tract stretches eastwards from the Indus to the Eastern Nára. Sand-hills abound on the eastern border, and large tracts rendered sterile for want of irrigation occur in other parts of Sind. Forests of *Acacia arabica* in some parts stretch along the banks of the Indus for miles, but the forests as a whole are not extensive. The delta of the Indus contains no forests, but its shores and inlets abound with low thickets of mangrove-trees. Herds of buffaloes graze on the swampy tracts of the delta, and sheep and goats abound in Upper Sind. The dryness of the soil, and the almost entire absence of rain, render irrigation very important. Thus the Indus is almost to Sind what the Nile is to Egypt. Numerous irrigation canals, drawn from the main river or its tributaries, intersect the country in every direction. The tilled land yields two crops annually; the spring crop consisting of wheat, barley, grain, oil-seeds, indigo, hemp, and vegetables; the autumn crop of millet, sorghum (the two chief food-grains in Sind), rice, oil-seeds, pulse, and cotton. The native fauna includes the tiger, hyæna, wild ass, wolf, fox, hog, antelope, and ibex. Domestic animals include camels, buffaloes, horses, sheep, and goats. Venomous snakes abound, and yearly cause a large number of deaths. The river fisheries of the Indus supply the province with fresh fish, and afford a considerable export trade. The trade of Sind centres almost entirely upon the great seaport of Kurrachee; the chief exports are raw cotton, wool, and grain of various kinds. The climate ranks among the hottest and most variable in India. The average temperature in summer is 95° F., and in winter 60°. But it frequently rises to 110° in summer, while in winter it falls at night a few degrees below freezing-point, and ranges during the day from 40° to 80°. The hot season lasts from March to September, the cold from October to March. About 78 per cent of the population are Mohammedans; 12 per cent Hindus; 5 per cent Sikhs; and the rest Christians, Jains, Parsees, Jews, Buddhists, &c. The natives are very ingenious as artisans. The leading textile fabrics are coarse silk, cotton, or mixed cloths. The history of Sind is of little interest. It was subdued by the Mogul Emperor Akbar in 1580, since which period it has always been either nominally or really tributary. In 1739 it fell under the power of Nadir Shah, but on his death it reverted to the imperial sway of Delhi. From about the middle of the last century it was subordinate to Afghanistan. Civil dissension in the end of last century led to the elevation of the Talpur dynasty of the 'Ameers.' The government then became a wholly unchecked military despotism, upheld by a feudal soldiery. The hostility displayed by the Ameers of Sind towards the British, during and after their operations against the Afghans, led ultimately to its invasion by British troops, and final conquest by Sir C. Napier's victory at Miani in 1843. Sir C. Napier was appointed its first governor, and it was soon after annexed to the presidency of Bombay. Pop. (exclusive of Khairpur, 131,937), 2,871,774.

Sindhia, Scindiah, the hereditary title of the head of a Mahratta dynasty ruling in Gwalior, which was founded in 1738 by Ranojee Sindhia, a chief who raised himself from obscurity by his own merits. He died in 1754. In 1781 Madaji Sindhia negotiated a peace between the British and the Mahrattas, and having introduced European discipline and tactics into his army, possessed himself of Delhi, Agra, and the person of the Mogul emperor, in whose name he subsequently acted. He was the most powerful member of the Mahratta confederacy. His successor Dowlut Rao Sindhia was defeated by Wellington at Assaye, and at Delhi and Laswari by Lord Lake. After his death in 1827 the state became disorganized, and order was only restored after the battles of Maharajpur and Punnair (1843), in which the British troops were victorious. The state was then constituted subsidiary to the British government. At that time the ruling chief, Babajee Rao Sindhia, was a minor. He

was loyal during the mutiny, and was subsequently made a G.C.B., and invested with the Star of India. He was succeeded by an adopted son in 1886. See *Gwalior*



Sine, in trigonometry, a line drawn perpendicularly from one end of an arc of a circle upon the diameter drawn through the other end. The sine of the arc is also the sine of the angle subtended by the arc; that is, CE is the sine of the arc CH and the angle COH.

Singapore, a British possession, forming one of the Straits Settlements, and consisting of a small island, lat. 1° 17′ N.; lon. 103° 50′ E.; and its capital of same name, with numerous surrounding islets, off the southern extremity of the Malay Peninsula, and separated from the mainland by a narrow strait 2 miles to ½ mile in breadth. The principal island, which is undulating and well clothed with wood, is about 25 miles long and 14 miles average breadth; area, 206 square miles. The climate is hot, the average summer heat being 84°, and the winter

temperature 76°. The annual rainfall averages about 102 inches. Though so near the equator the island is remarkable for its salubrity. Cultivated products include nutmegs, cloves, ginger, pepper, sugar-cane, coffee, pine-apples and other fruits, sweet-potatoes and other vegetables. Singapore possesses all the fruit-bearing trees of the Indian Archipelago. A delicate sea-weed called *agar-agar* is an important article of commerce for China and the eastern markets. Plantations are now numerous. Birds include pea-fowls, pheasants, partridges, &c. Amongst reptiles are turtles, tortoises, crocodiles, cobras and other serpents. The coast and rivulets abound with fish. Pop. 184,554. —The town of Singapore is situated on a rivulet on the south side of the island. It is divided into three parts—the western, inhabited by Chinese; the central, by the Europeans; and the eastern, by the Malays. The central part is laid out in regular streets, lined with substantial brick houses. Here are the principal public offices, official residences, hotels, exchange, and churches. The harbour is commodious, and is now strongly fortified, being a naval coaling-station. It has excellent accommodation for shipping, including a special dock for the navy. Singapore is the great entrepôt of Southern Asia and the Indian Archipelago, and the port is practically free. Exports consist of tin, coffee, rice, sago, tapioca, pepper, nutmegs, rattans, gambier, sugar, bees'-wax, raw silk, gutta-percha, mother-of-pearl, &c. Imports from Great Britain include cottons, woollens, coals, iron, arms, wines, and various manufactures; and from Europe and the United States, wines, spirits, liqueurs, manufactured goods, provisions, &c. Singapore is the capital of the Straits Settlements, and the residence of the governor. The total value of imports and exports now amounts to £40,000,000 or £50,000,000 annually. In 1819 the British obtained permission to build a factory on the southern shore of the island; and by treaty in 1824 purchased from the Sultan of Johore in the Malay Peninsula opposite the fee-simple of the island. Pop. 162,547. See *Straits Settlements*.

Singhalese. See *Ceylon*.

Singha'ra Nuts, the name in India for the edible fruits of *Trapa bispinōsa*. See *Trapa*.

Singhbhum, a British district in Bengal, India; area, 3753 square miles. The inhabitants are almost all hill tribes, who formerly gave the British much trouble. Pop. 545,488.

Singing. See *Voice*.

Singing Flames. A small gas flame, when surrounded by a glass tube, produces a musical note which depends on the length of the tube, just as the note from an organ-pipe depends on the length of the pipe. According to Faraday this is due to the extremely rapid explosions of the burning gas strengthened into musical notes by the resonance of the glass tubes.

Sing-Sing, a town of the United States, delightfully situated on the left bank of the Hudson, sloping up to the height of 200 feet, in the state and 30 miles north of the

city of New York. It has a large state prison with 1320 cells, military and other schools, fine private residences, &c. There are manufactories of tools, carriages, and hardware. Pop. 9352.

Singular Successor, in Scotch law, one who succeeds to real estate, not being the heir at law, as a purchaser.

Sinigaglia (sin-i-gäl'yà; anciently *Sena Gallica*), a seaport in the province of Ancona, Italy, on the Adriatic. It has a small harbour and a considerable fishing trade, and is frequented for sea-bathing. Sinigaglia was founded by the Senonian Gauls, and received a Roman colony in B.C. 289. It now presents quite a modern aspect. Pop. 9602.

Sin'ister, in heraldry, a term which denotes the left side of the escutcheon.

Sinking Fund, a term applied to a scheme followed in Great Britain for a number of years, by which it was expected to bring about the gradual extinction of the national debt. This scheme was first projected in 1716 by Sir Robert Walpole, but it was not developed until 1786, when Pitt proposed that the sum of £1,000,000 sterling should be set apart from the income of the country for the extinction of the debt. This scheme was not strictly adhered to, for the fund was not kept up by the application of the surplus revenue, but by sums borrowed for the purpose, and in this consisted the fallacy of the scheme. After a quarter of a century it was found that the debt was actually increased owing to the money having been borrowed upon less advantageous terms than those upon which an equivalent amount of debt was redeemed. In 1828 the whole plan was considered fallacious and abandoned. Later sinking funds with less ambitious objects have proved fairly successful.

Sinope (si-nō'pe; Turkish, *Sinoub*), a seaport of Asiatic Turkey, situated on the neck of land connecting the rocky peninsula of Cape Sinope, in the Black Sea, with the mainland, 350 miles E.N.E. of Constantinople. It possesses a fine harbour, and has a naval arsenal and a building-yard. On November 30, 1853, eighteen Russian ships attacked and destroyed a Turkish flotilla in the harbour. Sinope is an ancient Greek town, and was the birthplace of Diogenes and capital of Mithridates the Great. Pop. about 3000.

Si'nople, red ferruginous quartz, of a blood or brownish red colour, sometimes with a tinge of yellow. It occurs in small very perfect crystals, and in masses resembling some varieties of jasper.

Sinter, incrustations on rocks, derived from mineral waters. Various adjectives are prefixed to the name in order to indicate the nature of the deposit; thus we have *calcareous* sinter, *siliceous* sinter, *ferruginous* sinter, &c.

Sinus, in anatomy, a term applied to cavities in certain bones of the head and face, and also to certain venous canals into which a number of vessels empty themselves. In surgery, a sinus is an unnatural suppurating canal which opens externally. When it communicates internally with one of the normal canals or cavities of the body it is usually termed *fistula*.

Sion (sē-ōn; German, *Sitten;* ancient, *Sedunum*), capital of the canton of Valais, Switzerland, picturesquely situated near the right bank of the Rhone, 58 miles east of Geneva. It has narrow streets, a Gothic cathedral (end of 15th century), episcopal palace, seminary for priests, &c., and is overlooked by two hills crowned by ruined castles. Pop. 5447.

Sion College, an institution in London, founded in 1630 by Rev. Dr. White for the benefit of the London clergy. It maintains forty pensioners, and has a library (65,000 vols.) which was formerly entitled to claim a copy of every book published in Britain. New buildings, costing £25,000, were opened on the Thames Embankment by the Prince and Princess of Wales in 1886.

Siout (si-öt'), or ASSIOOT, the capital of Upper Egypt, near the left bank of the Nile, 229 miles from Cairo by rail. The streets are narrow and unpaved, and the houses are generally mere hovels. It has several handsome mosques, bazaars, and baths. It is celebrated for its red and black pottery, which finds a market all over Egypt. It was formerly much frequented by caravans from the interior of Africa, but the trade with the Soudan has been stopped since the rebellion of the Mahdi. Pop. 31,600.

Sioux (sö), or DAKOTA INDIANS, a North American family of Indian tribes dwelling chiefly in S. Dakota and Nebraska, and originally extending from Lake Winnipeg on the north to the Arkansas River on the south. They have several times engaged in hostilities with the United States settlers and troops, chiefly because faith was not kept with them by the government. In 1862 more than a thousand settlers were killed.

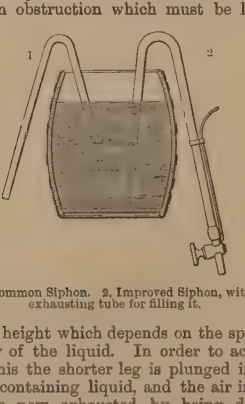
In 1876 a body of them who had taken up a position in the Black Hills cut off General Custer and 1100 men.

Sioux City, a rapidly growing town of Iowa, U. States, on the E. bank of the Missouri, with large stock-yards and varied industries. Pop. 37,806.

Sioux Falls, a town of S. Dakota, U.S., on the Big Sioux River. Pop. 10,177.

Siphan'to (ancient *Siphnos*), a rocky but fertile island of the Cyclades, about 12 miles west of Paros. Pop. 3851.

Siphon, a bent pipe, one leg of which is longer than the other, through which a liquid may, by the action of gravity, be transferred from one place to another at a lower level over an obstruction which must be lower



1, Common Siphon. 2, Improved Siphon, with exhausting tube for filling it.

than a height which depends on the specific gravity of the liquid. In order to accomplish this the shorter leg is plunged into a vessel containing liquid, and the air in the tube is now exhausted by being drawn through the longer leg, whereupon the liquid will flow out of the vessel through the siphon until the surface of the liquid is brought down to the level of the opening of the short leg of the siphon. The water rises by the weight of the atmosphere, and the leg by which it is discharged must always be longer than the other to give a greater weight of water in this leg. Sometimes an exhaust tube is attached to the longer leg for the purpose of exhausting the air by motion and causing the flow to commence; but an equally effectual method is to fill the tube with liquid and then to put it in position while still full, the ends of course being at first stopped. The principle of the siphon has been employed in aqueducts and in drainage works. Water can be siphoned to a height of 32 feet. The principal use of the siphon is for racking wines and liquors from off their lees.

Siphon, the name applied in zoology to the tubes through which water has egress from, and ingress to, the respiratory or breathing organs of certain univalve and bivalve mollusca.

Siphon Barometer. See *Barometer*.

Siphonoph'ora, a sub-class of Hydrozoa, otherwise named Oceanic Hydrozoa, delicate organisms, generally provided with 'swimming-bells.'

Siphonostom'ata, the division of gasteropodous molluscs, of which the whelk is an example. The shell possesses a notch or tube for the emission of the respiratory siphon.

Sipun'culus, a genus of Annulosa, often placed among the echinoderms, and including the spoon-worm (which see).

Sir, as a title, belongs to knights and baronets, and is always prefixed to the Christian name.—*Sire* is a term of respect by which kings are addressed. The word *sir* is the same as *sire*, and is derived from old French *senre*, and that from *senior* (Latin, elder), whence also *seignior*, *signor*, similar terms of courtesy.

Sirajganj', a town of India, in Pabna district, Bengal, and the most important river mart in the province. It is situated near the main stream of the Brahmaputra. Pop. 23,267.

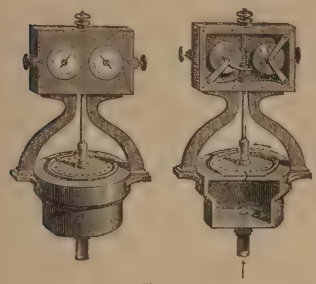
Sir-Daria, a Russian district, Central Asia, which lies on both sides of the river Jaxartes or Sir-Daria; area, 165,358 square miles; pop. 1,239,659. The chief town is Tashkend.

Sir-Daria, JAXARTES, or SIHON, a river in Central Asia, which rises in the western slope of the Thian Shan Mountains, and flows through the Russian districts of Ferghana and Sir-Daria into the north-east side of Lake Aral, after a tortuous course of about 1200 miles. It is of little value for navigation.

Sire'don, the axolotl (which see).

Siren, or MUD-EEL, a genus of amphibian vertebrates, belonging to the perennibranchiate section of the order Urodela. The *Siren lacertina* of North America is the familiar species. It is dark brown in colour, and has two front limbs, each with four toes. The average length is about 3 feet. There are three external gill-tufts, and the tail is long and slender. It inhabits the rice-swamps of South Carolina. It prefers damp muddy situations, and feeds upon worms and insects.

Siren, an instrument for producing continuous or musical sounds, and for measuring the number of sound waves or vibrations per second, which produce a note of given pitch. In its original form it consists of a disc with a circular row of oblique



Siren.

holes, revolving close to the top-plate of a wind-chest perforated with corresponding holes of a contrary obliquity, so that the jets of air from the latter passing through the former keep the disc in motion, and produce a note corresponding to the rapidity of the coincidences of the holes in the two plates, the number of coincidences or vibrations in a given time being shown by indices which connect by toothed wheels with a screw on the axis of the disc. See also *Fog-signals.*

Sire'nia, an order of marine herbivorous mammals, allied to the whales, having the posterior extremities wanting, and the anterior converted into paddles. They differ from the whales chiefly in having the nostrils placed in the anterior part of the head, and in having molar teeth with flat crowns adapted for a vegetable diet. They feed chiefly on sea-weeds, and frequent the mouths of rivers and estuaries. This order comprises the manatee and dugong (which see).

Sirens, in Greek mythology, the name of several sea-nymphs, who by their singing fascinated those who sailed by their island, and then destroyed them. When Ulysses approached their island, which was near the coast of Sicily, he stuffed the ears of his companions with wax, while he bound himself to the mast, and so they escaped. The Sirens then threw themselves into the sea, where they became formidable rocks. Another story is that they threw themselves into the sea because vanquished in music by Orpheus.

Sirhind, a tract of land intervening between the Jumna and Sutlej rivers, Punjab, India. The whole tract has hitherto been unfertile from want of irrigation, but the lately-opened Sirhind Canal will doubtless remedy this defect.

Sirikul', a lake on the Pamir plateau, Central Asia, 15,000 feet above the sea. It is about 14 miles long by 1 mile broad, and is the source of the chief branches of the Amu Daria or Oxus.

Sirinagur. See *Srinagar.*

Siripul', a town in Afghan Turkestan, 100 miles S.W. of Balkh. The inhabitants are chiefly Uzbeks. Pop. about 18,000.

Sirius, the brightest star in the heavens, also called the Dog-star, situated in the mouth of the constellation Canis Major, or the Greater Dog. It is estimated to have more than 13 times the sun's magnitude. See *Dog-days.*

Sirocco, a hot, relaxing, and oppressive south-east wind, which blows in Sicily and South Italy. See *Simoom.*

Siro'hi, a native state in the Rajputana Agency, India; area, 3020 square miles. The country is much intersected and broken up by hills and rocky ranges, and frequently suffers from drought. Wheat and barley are the staple crops. Pop. 142,903.

Sirsá, a British district in the Punjab, India; area, 3004 square miles. It forms for the most part a barren and treeless plateau. A great cattle fair is held at Sirsá, the chief town, in August and September. Pop. 253,275; of town, 12,292.

Sisal', or GRASS HEMP, a species of agave yielding a valuable fibre, a native of Mexico, Honduras, Central America, and specially cultivated in Yucatan. It is grown upon stony ground, and the leaves, from which the fibre is prepared, are between 2 and 3 feet long. The pulp is cleaned away from each side of the leaf and the remaining fibre is then washed and sun-dried. It has considerable commercial value in the manufacture of cordage and coarse cloth.

Sis'cowet, or SISKOWIT (*Salmo siscowet*), a species of N. American lake-trout, inhabiting chiefly the deep water of Lake Superior and other lakes.

Siskin (*Fringilla spinus*), a species of European finch, the plumage of which is chiefly green, particularly on the back and upper parts, with yellow patches on the neck, breast, and behind the ear. These

birds are usually seen in small flocks, haunting the margins of streams, and feeding on the seeds of rushes, elder-trees, and other plants. The siskin inhabits Britain, and has a pleasant song. The siskin and canary, when interbred, produce a hybrid progeny with a sweet mellow song.

Sismon'di, JEAN CHARLES LÉONARD SIMONDE, historian and political economist, the son of a Protestant minister, was born in Geneva, 9th May, 1773, and educated at the college of that town. In 1793 the overthrow of the government compelled him to flee with his father to England. On his return, two years after, he was imprisoned, and lost the greater part of his property by confiscation. Similar persecution followed him even in Tuscany, whither he proceeded in 1795; but at length, on his return to Geneva in 1800, he was allowed to live in quietness. His first published work appeared in 1801, and was entitled Tableau de l'Agriculture Toscane. In 1803 he published a work entitled De la Richesse Commerciale, ou Principes d'Économie Politique appliquée à la Législation du Commerce. This essay was afterwards remodelled so as to form the groundwork of his treatise published in 1819 under the title of Nouveaux Principes d'Économie Politique. In 1807 appeared the first two volumes of his Républiques Italiennes, which ultimately reached sixteen volumes, and was not completed till 1818. In 1819 he commenced his Histoire des Français, a great work which was to occupy the greater part of his remaining life. He died of cancer, June 25, 1842. His chief works, besides those mentioned, were De la Littérature du Midi de l'Europe (four vols., Paris, 1813–29); Histoire de la Renaissance de la Liberté en Italie (two vols., Paris, 1832); and Histoire de la Chûte de l'Empire Romain et du Déclin de la Civilisation de 250 à 1000.

Sissoo. See *Dalbergia.*

Sistan, an extensive level and low-lying tract on the borders of Persia and Afghanistan, partly filled by the Hamun (Sistan) Lake or swamp. It is divided between Persia and Afghanistan.

Sisterhoods, a name given to various religious and charitable orders or associations of women. These are very numerous, and have recently increased in number. Among the more important are:—(1) Sisters of Charity (also called Gray Sisters, Daughters of Charity, Sisters of St. Vincent de Paul), a Roman Catholic order founded in 1634 at Paris by St. Vincent de Paul for the work of nursing the sick in hospitals. The sisters take simple vows of poverty, chastity, and obedience, which are annually renewed; they add a fourth vow binding themselves to serve the sick. They number about 40,000 in upwards of 2000 houses scattered over all parts of the civilized world. Besides nursing and conducting orphanages, the sisters sometimes undertake the management of poor schools. (2) Sisters of Charity (Irish), a congregation in no way connected with the above, founded in 1815 by Mary Frances Aitkenhead, for the purpose of ministering to the sick and poor in hospitals, and at their own homes. (3) Little Sisters of the Poor, founded in France in 1840, now spread over the world. Their chief object is the care of the aged poor, and they beg from house to house. (4) Sisters of Mercy (Irish), an important and flourishing order, founded by Catherine M'Auley, Dublin, in 1827, for carrying on works of mercy both spiritual and corporal. (5) Sisters of Mercy (Anglican), an important body founded in 1845 by Dr. Pusey, the original London house being the pioneer of many charitable Sisterhoods connected with the English Church, and passing under various names. See *Mercy,* (*Sisters of*).

Sisters of Charity, &c. See *Sisterhoods.*

Sistine Chapel (*Capella Sistina*), a chapel in the Vatican, so called from Pope Sixtus IV., by whom it was erected in 1473. See *Vatican.*

Sis'tova, a town and port of Bulgaria, 35 miles S.W. of Rustchuk, on the right bank of the Danube. It is poorly built, but has an active trade. Pop. 11,438.

Sistrum.

Sistrum, a kind of rattle or jingling instrument used by the ancient Egyptians in their religious ceremonies, especially in the worship of Isis. It consisted of a thin somewhat lyre-shaped metal frame through which passed loosely a number of metal rods, to which rings were sometimes attached.

Sis'yphus, a mythical king of Corinth who promoted navigation and commerce, but was fraudulent, avaricious, and deceitful. For his wickedness he was severely punished in the nether world, being obliged to roll a heavy stone to the top of a hill, on reaching which it would always roll back again, thus rendering his punishment eternal.

Sita'pur, a district of British India, in the prov. of Oudh, North-western Provinces; area, 2255 sq. miles; pop. 1,075,413. The district consists of a plain, and is well-wooded and closely cultivated, except where the soil is barren or cut up into ravines. —SITAPUR, the capital of the district, is picturesquely situated on the Saráyan river, 52 miles N. by W. of Lucknow. There are cantonments here. Pop. 21,380.

Sitka, or NEW ARCHANGEL, the capital of Alaska, United States, on the west coast of Baranoff Island. It has a small but commodious harbour. The inhabitants are chiefly engaged in catching and curing salmon. Pop. 1188.

Siva, the name of the third deity in the Hindu triad (Brahma, Vishnu, and Siva), in which he is represented as the destroyer and also as the creator or regenerator. His worshippers (the most numerous of the Brahmanic sects) are termed Saivas, and assign to him the first place in the trinity, attributing to him also many attributes which properly belong to the other deities. His symbol is the *lingam* or *phallus*, emblematic of creation. He is frequently represented riding on a white bull, with five faces and two, four, eight, or ten hands, having a third eye in the middle of his forehead pointing up and down, and carrying a trident. Serpents commonly hang about him, and he may be seen with a sort of mace in one hand and an antelope in another. See *Brahmanism.*

Siva.

Sivas' (anciently *Sebaste*), a town in Asiatic Turkey, near the centre of a large and fertile plain watered by the Kizil Irmak, 410 miles E.S.E. of Constantinople. It has numerous mosques, large and well-supplied bazaars, commodious khans, baths, &c. Being on the road from Bagdad, and having easy access to the Black Sea, it commands a considerable trade. Pop. about 50,000.

Sivash', or PUTRID SEA, a lagoon on the N.E. border of the Crimea, South Russia, separated from the Sea of Azov by a narrow strip of land called the Tongue of Arabat. In summer and autumn it becomes a vast marsh giving off pestiferous vapours, hence its name.

Sivathe'rium, an extinct genus of ruminant animals, the fossil remains of which occur in the Pliocene Tertiary deposits of the Siwalik Hills in Hindustan. A single species (*S. giganteum*) only has been determined. It surpassed all living ruminants in size. It had four horns and a protruding upper lip, and must have resembled a gigantic antelope or gnu.

Siwah, or AMMON, an oasis in Egypt, 320 miles W.S.W. of Cairo, 78 feet below the sea-level; 6 miles long by 5 miles broad. It abounds in date-trees, yielding fruit of very superior quality. Here are the ruins of the ancient temple of Jupiter Ammon. Many of the sculptures, including figures of Ammon, with the attributes of the ram-headed god, still remain. Pop. 5600.

Six Articles, STATUTE OF, a law made by 31 Henry VIII. cap. xiv., and styled An Act for Abolishing Diversity of Opinions. It was passed on June 7th, 1541, and came to be commonly known as the *bloody statute.* It enacted that if anyone did deny the doctrine of transubstantiation (1), he should be burnt; and that if anyone preached, taught, or obstinately affirmed or defended that the communion in both kinds was necessary (2), or that priests might marry (3), or vows of chastity be broken (4), or private masses not used (5), or that auricular confession was not expedient (6), it should be felony. The act was at first vigorously enforced; but after undergoing some mitigation in 1544, it was finally repealed in 1549.

Sixtus V. (FELIX PERETTI), the greatest ruler and statesman among the popes of the three last centuries, was born in 1521 near Montalto, died 1590. He entered the Franciscan order in 1534, and distinguished himself in scholastic philosophy, theology, and Latin literature. In 1544 he taught the canon law at Rimini, and two years later at Siena. In 1548 he was made priest, doctor of divinity, and superintendent of the monastic school at Siena. In 1556 he was appointed director of the Franciscan school at Venice, and afterwards inquisitor-general. In 1560 he went to Rome, where the pope conferred upon him several dignities. In 1570 he was created cardinal, and

took the name Montalto. Under Gregory XIII. he lived a retired life for some years in his villa, and is said to have assumed the mask of pious simplicity and old age in order to prepare himself for the papal chair. On Gregory's death in 1585 he was unanimously elected pope, and immediately manifested himself an able and energetic ruler. He restored order in the States of the Church, cleared the country of bandits, and regulated the finances. He re-established discipline in the religious orders, and fixed the number of cardinals at seventy. He took a part in most of the great political events then agitating Europe. He supported Henry III. against the Huguenots, and Philip II. against England. The great aim of his foreign policy was the promotion of the cause of Roman Catholicism throughout Europe against Protestantism.

Si'zar, a term used in the University of Cambridge, and at Trinity College, Dublin, to denote a class of students of limited means who usually receive their commons free and are pecuniarily assisted otherwise. They were originally required to perform certain duties of a menial character, but this practice has long ago fallen into desuetude. Formerly there was a similar class of students at Oxford called servitors.

Size. See *Glue.*

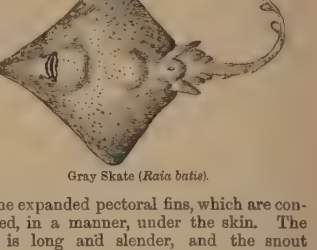
Sjælland (syel'lân). See *Sceland.*

Skagen, CAPE, or THE SKAW, the extreme northern point of the province of Jutland, Denmark. A lighthouse, 67 feet high, built by Frederick II. in 1564, is situated on the cape. The village of Skagen, close by, has 2000 inhabitants.

Skager-Rack, a broad arm of the German Ocean, which washes Norway on the north, Jutland on the south, and Sweden on the east, where it communicates with the Cattegat; length, W.S.W. to E.N.E., about 150 miles; breadth, 80 miles. Its depth varies from 30 to upwards of 200 fathoms. There are several good harbours on the Norwegian and Swedish coasts.

Skalds. See *Scalds.*

Skate, a name popularly applied to several species of the genus of fishes *Raia* or rays. The skeleton is cartilaginous, the body much depressed, and more or less approaching to a rhomboidal form. The common skate (*Raia batis*) agrees with the other members of the genus *Raia* in possessing a flat broad body, the chief portion of which is made up



Gray Skate (*Raia batis*).

of the expanded pectoral fins, which are concealed, in a manner, under the skin. The tail is long and slender, and the snout pointed, with a prominent ridge or keel. The teeth are arranged in a mosaic or pavement-like pattern. This fish, although commonly seen of moderate dimensions, may attain a weight of 200 lbs. or more.

Skates and Skating. A skate consists of a frame shaped somewhat like the sole of a shoe, underneath which is fastened a metallic runner, the whole being intended to be fastened, one under each foot, for gliding rapidly over the ice. Skating seems to be of great antiquity, mention being made of it in the Edda. Both in Edinburgh and in London skating was a highly popular amusement several centuries ago. In Holland, from time immemorial, skates have been used by all classes of people upon the canals and rivers for the facility of locomotion they afford. Great variety in the manufacture of skates has been introduced within a comparatively short period. In the most improved forms the wood of the older skate has been replaced by metallic fittings, and the skate is attached to the foot by spring fastenings, which obviate the need for straps. A kind of skates, termed 'parlour skates' or roller skates, in which the metal runner is replaced by small wheels, is used on a prepared asphalt or other smooth flooring.